The Iron Age

A Review of the Hardware and Metal Trades.

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The Chilean International Exposition.

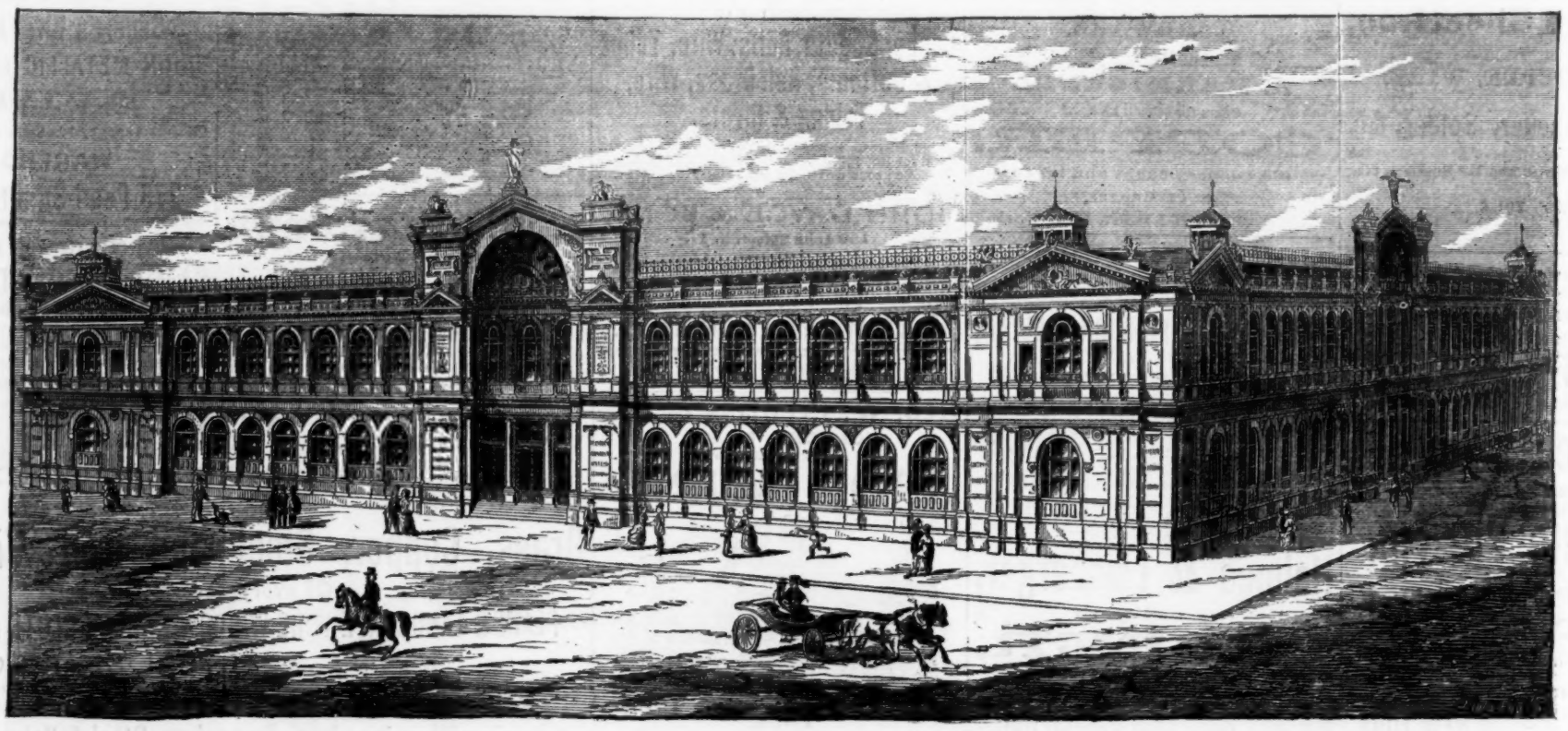
The attention of our readers having been called to this World's Fair of our sister republic, by an announcement in our columns of special notices, we gladly furnish such items of information as seem to us of interest to such of our citizens as may desire to contribute to it. The accompanying illustration represents the principal building, or Palace, of the Exposition, and is now very nearly completed. It is a substantial structure of brick, stone and iron, architecturally neat, and by competent judges thought to be ample in its dimensions. It is located in a very central part of the Botanic Garden, at Santiago, the capital of the republic, and is reached by special branch tracks of railroad from all the chief towns and ports of the country. That our readers may better understand the locality, we will explain that the Botanic Garden at Santiago is located as centrally to that city as Central Park is to New York. Beside the accommodations afforded by the Palace, very extensive and complete arrangements have been made for the exhibition of machinery in detached buildings and in the open park adjoining the Palace. This is an arrangement very conducive to economy of building, where practicable, which it happens to be at Santiago, for the reason that during the period of the year the exposition will continue, from the 15th of September to the 1st of January, rain never falls, and therefore protection from storm is never needed, a tent or an open shed to protect from the sun being the most that many classes of exhibitors of machinery will require, and really the most agreeable. In this connection we will add that, according to a record through 26 years, the rainy hours at Santiago averaged only 215½ per year, and as it all, or nearly all, occurs during the latter half of May, June, July and the first half of August, or three months, it amounts to a little less than 2¼ hours daily for that period. Santiago is in S. latitude about 33½; is located near the foot hills of the Andes, in the great central valley of Chili, which reaches from the Andes to the coast range of hills; is about 100 miles from Valparaiso, its chief port, and has about 200,000 inhabitants. Valparaiso, the second city in size, is in S. latitude about 33, and has about 150,000 inhabitants. It communicates with Santiago by a first-class railway, which runs through a valley and hill and mountain region whose picturesque beauty combines in a few hours all we have on the Hudson, the Mohawk, at the Delaware Gap, and at the overland passes of our Sierra Nevada. Within the last ten years Chili has had several fairs or expositions of a local, State or international character. They have been followed by results so satisfactory to her people that the government has been induced to undertake the organization of this grand international one for 1875. It appearing to be a matter of public regret that at a former exposition, to which foreigners were invited, the United States were but small contributors, especial efforts have this time been made to encourage our people to improve this opportunity of competing with Europeans who have, up to this time, enjoyed an almost complete monopoly of trade with that Republic. Chili, as our people may not generally know, has a special reason for desiring practical acquaintance with the labor saving inventions of the United States. This reason is that, with a soil, a climate, and a mineral wealth in all respects equal to California, she has been entirely unable to compete with the latter State even in her own market, because of the immense advantage—especially in all agricultural departments—California has in the use of labor-saving machinery. As regards the development of her mineral resources little less can be said. We cannot give such of our readers as desire the information a more correct idea of the character and capabilities of the climate and soil of Chili, and of her requirements, than by stating that they are very nearly exactly the same as those of our own California. Therefore, to our manufacturers, who ask what are the requirements of Chili as regards articles of manufacture, and of machinery, we simply say, those demanded by California will also find a market in Chili. Our special notice of the exposition announces the fact of an effective and very unusual measure for the encouragement of our people to send articles to it. They are, to all intents and purposes, transported to the place of exhibition from New York, and from our Pacific ports, gratuitously. The details of this transportation are as follows:

The Pacific Mail S. S. Co., alive to the importance of cultivating this desire of the Chilean people to see the United States, take a conspicuous part in this exposition, offer to transport all packages to Panama for a mere nominal sum. At that port the packages are transported to the steamers of the South American Steamship Co., owned and managed by Chileans, and subsidized by the government of Chili, and carried to Valparaiso without charge. Here they are delivered to the exposition agent, who is also an officer of the customs, and are forwarded to the place of exhibition free of charge, the railway being the property of the government. It will thus be seen that little has been left undone to secure the rapid and safe transportation of contributions to the exposition, and their safe delivery to the responsible agent of the government, and at rates which no one can consider expensive. Added to this, Chili pays $40, gold, toward the expense of the passage to the country of all persons accompanying and required for the exhibition of all contributions sent to it.

We are informed that efforts are now making to obtain the *free* passage of all such persons, and with great promise of success.

While this exposition is to be held at Santiago, and under the especial auspices of the government of Chili, as relates to the United States, it cannot be considered as other than a South American Fair, for all the States, and all the various interests of tropical and temperate South America will there be represented, and there seek a supply for their wants. We therefore believe it an opportunity so unusual and so promising that American manufacturers cannot afford to neglect it.

A new process of fusing and treating metals in what the inventor, M. A. Grebel, calls blow pipe furnaces, is very inefficiently described. The inventor speaks of his apparatus as rather complicated, but as characterized by two salient points. The first of these is the blow pipe furnace, in which all the metals may be melted, and even ores treated if necessary. The main object of these furnace is to replace the Wilkinson's for second fusion. This is accompanied by apparatus for heating the gases by means of the lost heat of the furnace. The other point is "distillation-furnace," with special apparatus, which serves to bring the gases in communication with the "blow pipes" of the furnace. This distilling apparatus is described as being in certain cases ordinary coke furnaces, so arranged as to heat each other mutually and alternately, or simultaneously, at will, and the gas conduit of which is in communication with a refrigerator, which acts also as a reservoir.



THE CHILEAN INTERNATIONAL EXPOSITION BUILDING, SANTIAGO.

Mineral Oils for Lighthouses.

The questions of the substitution of mineral for vegetable oils in lubricating machinery, and the greater liability of the latter to what is known as "spontaneous combustion," have already been discussed at considerable length in these columns. The greater freedom, under due conditions, of mineral oils from that very perilous quality, in connection with its greater cheapness, ought to commend it to general use, especially in extensive establishments. It is not, however, surprising to find that the Trinity Corporation persist in excluding it from the English lighthouses under their control; for rarely do we find government boards ready to adopt changes tending either to increased efficiency or diminished cost. Captain H. H. Doty, who has been for some years successfully engaged in effecting the substitution of mineral for colza oil in lighthouse illumination, which certain patented improvements invented by him have rendered possible, and which have been introduced, along with the use of mineral oil, in the lighthouses of Scotland, and nearly every other country in which lighthouses exist, has applied to the Trinity Corporation in vain, and he now appeals from it to the Board of Trade, which he asserts has been misled with respect to his invention, by the corporation: 1. By persuading the Board of Trade that the colza oil burners in actual use might be adapted for the consumption of mineral oils at a trifling expense—a theory which having been proved impracticable, new burners have since been ordered at considerable cost. 2. By misrepresenting the difference between the cost of colza oil and mineral oil. 3. By erroneously reasoning against the use of mineral oils in lighthouses, and recommending as a necessity the wasteful expenditure of public money in consequence of using unsafe oils, while perfectly safe oils are within their reach in any quantity—and are used by the other lighthouse authorities in Europe and abroad—and contrary also to the declared opinions of the highest lighthouse authorities in the world, to be consistent with the safety of the service. 4. By seeking to depreciate the advantages obtained through the adaption of mineral oils, contrary to the ascertained greater economy, reliability, and increased illuminating power of forty-five per cent., thereby in effect depriving maritime commerce—whose safety and success greatly depends upon the efficiency of coast lights—of one of the chief boons which modern science has made available for that purpose. 5. By recommending the Board of Trade, in 1872, to withhold its sanction to the adoption of his burners by the Northern lighthouse authorities on the ground that the use of mineral oils in lighthouse illumination was then in its infancy; whereas no improvements in the amount of light obtained, or in the essential principle of his burners has been made since his patent of 1868, in accordance with which all burners recently sanctioned, and now in course of installation, as the most perfect burners for that purpose—and incapable of improvement—are constructed. 6. By reporting adversely upon the novelty of his invention, whereas the Board of Trade was informed, through the British Embassy, in France, upon the authority of Mons. Reynand, that all attempts by lighthouse engineers and constructors to successfully burn mineral oils in the superior order of lighthouses had failed until a solution of the problem was arrived at by Captain Doty. The Trinity Corporation is further charged by Captain Doty with unfair and underhand attempts to vitiate the experiments with his burners, and in other ways, which, if true, is highly discreditable. In his letter to the Board of Trade, Captain Doty reports these charges, and then proceeds to show upon scientific authority, supported by experiment, that paraffin oil, with a high flashing test, is not only a safer and better, but a more economical illuminator than colza oil for lighthouse purposes.

With respect to freedom from accident, it is shown that properly selected oils may be stored in the ordinary 100 gallon covered cistern in use for the retention of oil without the risk of combustion or explosion, and this statement is supported by Drs. S. Macadam and Tyndall, and Mr. Valentine. As regards the comparative cost of mineral and vegetable oil, Captain Doty shows, according to M. Reynand, the eminent engineer of the French lighthouse service, that by the employment of his burners there is about forty-five per cent. increase in the amount of light sent upon the horizon, with thirty-two per cent. less expense, or more than £4000 a year. A similar sum is the estimated saving for Scotland, while for England it would not be less than £12,200.—*Iron.*

Cost of Labor in India.

The special correspondent of the *Times*, as a review of the Indian famine, under date June 14, writes: "In the enclosure of one of the hospitals—among the cleanest and wholesomest hospitals I have seen in India—we came to a well 40 feet deep. 'That,' said the gentleman who conducted me over the work, 'cost us six rupees—12/.' Imagine a well 40 feet deep being dug in England, and the sides cemented for 12/. The rate of labor really is so low that government, with a small sum of money, might do wonders. I saw another instance of the same class of facts a day or later. Moorshedabad is connected with the main line from Calcutta to Bombay by a line of about twenty-eight miles, terminating at a place called Nulhatti. The line was constructed on the simplest of plans, and belonged at first to the Oude and Rohilkund Railway Company, but never, I believe, met its own expenses; and a resolution was come to that it ought to be given up. An intelligent native servant of the company offered to take the line and pay the company five per cent. on the capital invested. The directors thought that the better plan would be to give this gentleman a salary with full powers of management, and this was carried out. The railway is now the property of the government, and pays at the rate of twelve per cent. on the capital. The staff would astonish English railway companies. At each end of the line there is a passable office. The intermediate stations are mud huts, at which a flag is raised if the train is required to stop. The cost, I suppose, of each station is little more than the amount of a coolie's labor. The result was so marked that the Mutlah (that is, the Port Canning) railway, south of Calcutta, was placed under the same management, and it, too, is on a fair way to paying, I suppose by reducing working expenses without losing the required efficiency. These are the kind of lines, and this the kind of management that one may trust to see introduced very extensively in India, as one means of preventing the possibility of famines in the future.

The production of perfectly pure reduced iron is said to be effected by means of purified hydrogen. The method of obtaining hydrogen without the admixture of any foreign body has been described by M. Dumas and M. Boussingault, but the oxide must also be purified from the water and sulphates which it contains. M. Crolas effects the latter in the following manner: He takes protochloride of iron, and clears it of the sulphates it may contain by means of chloride of barium, and in order to get rid of the excess of the latter salt it is only necessary to cause it to crystallize, and then dissolve it in distilled water. Finally the precipitation is effected by means of the ammonia of commerce, which may now be obtained free from sulphur. By this process M. Crolas avoids the washing of the oxide, for the hydrochloride of ammonia is easily driven off from the precipitate by heating the latter to redness. He thus obtains an oxide exempt from sulphur, which, when brought into contact with pure hydrogen yields perfectly divided iron, fulfilling all the required conditions. Another process consists in transforming protochloride of iron exempt from sulphur with oxide by means of calcination, in contact with the air. This operation, however, is both slow and difficult. The reduced iron prepared by these means is perfectly pure, and cannot give rise to the production of sulphureted hydrogen in the stomach. As a test for reduced iron, M. Crolas prefers oxalic acid, which may easily be procured pure, and which perfectly decomposes the sulphide of iron without giving rise to sulphureted hydrogen, which might be a cause of acting on the lead paper used in the testing. M. Fordos and M. Gelis have both proved that sulphuric acid, especially when concentrated, produces sulphurous acid when brought into contact with iron, and this in presence of nascent hydrogen is transformed into sulphureted hydrogen. In like manner hydrochloric acid should not be used as it almost always contains sulphurous acid.

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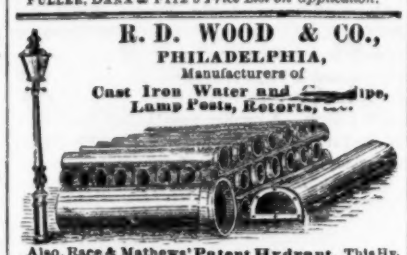

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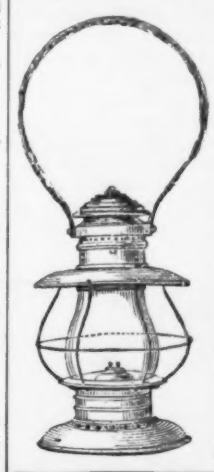

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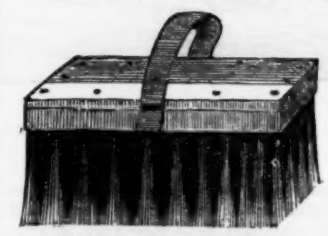

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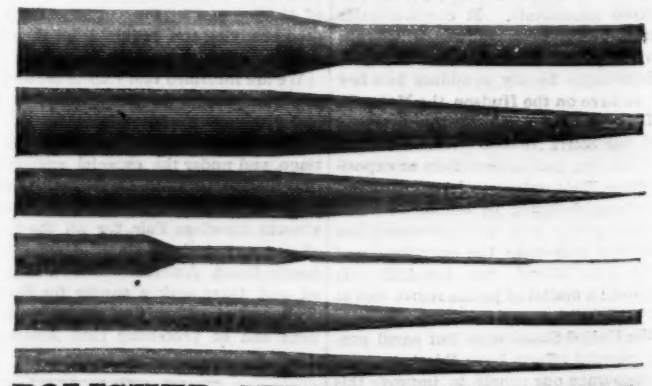

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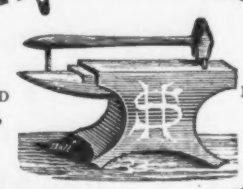

Trade PATENTED Sept. 16, 1873.

Mark. PATENTED Feb. 17, 1874.

Depot, No. 24 EXCHANGE PLACE, Jersey City, N. J.

This Welding Compound is of indispensable utility in all establishments where iron and steel are forged, whether on a large or small scale. It perfectly unites iron to iron, iron to steel, steel to steel, wrought iron or steel to cast iron, and iron or steel to Bessemer metal, without requiring the parts to be welded to be brought above a cherry red heat, and effecting a great saving in fuel over all other welding compounds or fluxes which require the metals to be brought to a white heat.

This compound is manufactured under the inventor's personal supervision, and is sold and warranted genuine under the above trade mark, in 5, 10, 50 and 100 lb. packages. Price for 5 and 10 lb. packages, 30 cents per lb.; for 50 and 100 lb. packages, 25 cents per lb. Samples sent on order.

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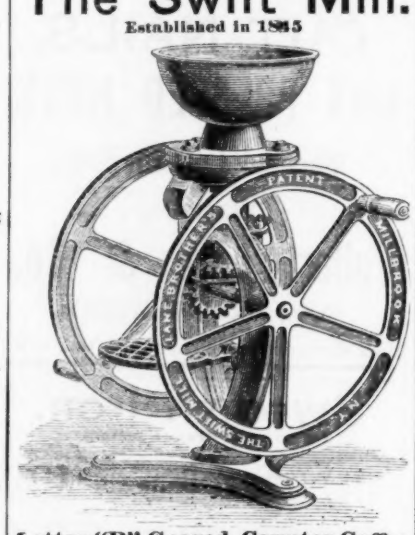

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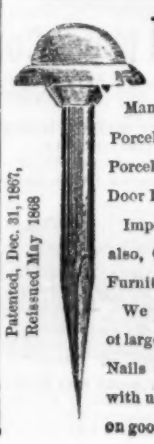

Patented, Dec. 31, 1867, Reissued May 1868

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We particularly invite the attention of large buyers to our Patent Picture Nails and Knobs being a specialty with us, we offer satisfactory discounts on good orders

Bessemer Steel and Silicious Ores.

It might almost be thought that Bessemer steel is a hackneyed and exhausted subject, and that the manfacture has now reached that stage when nothing new or interesting can be learnt and imparted in it. This idea would, however, be a mistake, as we feel convinced that time will show that steel manufacture is only in its infancy. It is our opinion that in years to come steel will be almost the only accepted form of iron in our arts and constructions. What is the ultimate aim of perfection in all well designed structures? The maximum of strength with the employment of the minimum of material. This object may, of course, be obtained in the use of any material; but owing to the increase of size in the span of our arches and buildings, and in the general magnitude of constructions, a strange and awkward dilemma meets the engineer or architect. He will ultimately, and not so remotely, reach a limit where he will find that it is impossible to build a stronger edifice or bridge by an increase in weight of this material. This is rather a startling ultimatum, but it is nevertheless an important one. We are accustomed, in our ordinary practice, to consider that a girder, other things being the same, of twice the depth of a given girder, is four times as strong, and so on without limit. But this is only true to a very small extent, for by increasing the depth of the girder, we, at the same time, increase the dead weight of the girder itself; and thus we reach a point where the gain in carrying power is counteracted by the increase in dead weight of material. Of course, the economical disadvantages arising from this cause are felt severely long before the ultimate limit of strength is reached.

The only escape from this dilemma is the use of a material which possesses the maximum tensile and compressive resistance, with the minimum of dead weight of material. These qualifications steel possesses in an infinitely greater degree than iron, and the engineers of the future will be thus inevitably driven to the more general use of steel instead of wrought iron. The value of steel rails in the long run is now pretty generally established everywhere, and other demands for this most useful material will, undoubtedly, soon follow.

The successful and, above all, the most economical process for the production of steel is thus of the utmost value to the engineering world, and any crumb of information promising further economy or success in the manufacture, should be carefully considered and made the most of. Though we have in England, so far, had the honor of primary introduction and the lead in after supply of cheap steel, principally by the Bessemer process, our neighbors on the Continent are bestirring themselves energetically in the matter, and bid fair, if we are not careful, to outdo us in further investigations and improvements in the manufacture of steel. It is a well known fact that, in the manufacture of Bessemer steel, as at present carried on, a considerable quantity of spiegeleisen is required for the suitable and proper conversion into good steel of the oxidized metallic bath, by adding a definite percentage of the above metal, for what is termed "recarburation." Even at the present time, with only a moderate demand, this spiegeleisen is a considerable expense in the converting process, and if the demand for steel should increase according to our anticipations, the comparative expense of the addition of spiegeleisen—from its limited sources of production—would be so materially increased, that the cheap production of steel would be effectually prevented.

We are happy, however, to be able to inform our iron and steel manufacturers that very probably a cheap substitute may be found for spiegeleisen in silicious ores. This substitution is founded on the principle that silicon has a greater affinity for oxygen than iron, and this idea seems to be well established by results obtained by Dr. Adolphe Schmidt on the other side of the Channel. The experiments made, and the results obtained, were as follows:

Charge A was recarbureted by 5·3 per cent. of spiegeleisen and Franklinite, 1·3 per cent. of Poughkeepsie iron; total, 6·6 per cent. The metal obtained was of the degree III¼; the ingots rolled well.

Charge B was recarbureted by 2·6 per cent. of Poughkeepsie iron, 4·0 per cent. of spiegeleisen and Franklinite; total, 6·6 per cent. The metal obtained was of the degree III¼; the ingots rolled very well.

Charge C was recarbureted by 4·0 per cent. of Poughkeepsie iron, 1·3 per cent. of spiegeleisen, 1·3 per cent. of Franklinite; total, 6·6 per cent. The metal obtained was of the degree III, and the ingots broke in rolling. Unfortunately, no analysis of these ingots were made, so the cause of brittleness was not ascertained properly, whether due to the presence of silicium, or to that of non-reduced oxides.

Charge D, recarbureted by 2·6 per cent. of Durham iron, 2·0 per cent. of spiegeleisen, 2·0 per cent. of Franklinite; total, 6·6 per cent. The metal obtained was of the degree III¼, and the ingots rolled well. The Poughkeepsie iron employed was an anthracite iron of a very silicious nature, employed with Cumberland iron in the fabrication of steel. The Durham iron was that of Messrs. Cooper & Hewitt, made from magnetic and silicious ores. The degrees mentioned are those of the classification by Dr. Schmidt, based on the hardness and angle of rupture. The degree III contains a proportion of carbon of 0·3 per cent. It is the quality most preferred by railway companies.

From the foregoing experiment, the facility for substituting a cheap silicious ore in the place of a large proportion of the dearer spiegeleisen is made clearly evident. The experiments are, however, anything but exhaustive, and the best proportion of mixture is by no means accurately established. The necessity for most exhaustive experiments arises from the fact that the presence of manganese renders the silicium inactive, and therefore it is advantageous to discover the minimum amount of spiegeleisen which may be used. Again, an excess of silicium is worse for steel than an excess of manganese, and therefore the determination of the minimum quantity of silicium necessary for the reduction, requires more accurate determination than is necessary for the employment of spiegeleisen. Undoubtedly an exhaustive course of further experiments in this matter would lead to important commercial results.—*Iron.*

Hints of Discoveries.

It is interesting, says a writer in the Philadelphia *Ledger*, to look over old records of scientific and other experiments, and to trace the beginnings of discoveries and inventions. The readers of the *Ledger* are aware, for instance, that the paper is printed from stereotyped plates. The latest improvement in the process is to press the face of the type against a thick prepared paper. The indention thus made forms a mold, in which the page is cast in thick plates or blocks of metal, curved on their surface. These are fixed together and form a cylinder of fixed types, under which the paper is rapidly passed to receive the impression. Any number of cylinders may be used, and by this means the enormous circulation of the *Ledger* is printed in season.

Among the hints toward stereotyping formerly made, may be mentioned certain suggestions by Cadwallader Colden, in 1743, over a century ago. His plan, in brief, was to make types of copper or other hard metal, the letters being sunk in the metal, instead of being raised, as at present. When a page was ready it was to be securely fastened and pressed upon a sheet of lead or type metal, giving the letters in relief on a solid plate. The metal was to be melted to take the impression of the page. So plain a process as using the page as the bottom of a mold into which the type metal should be poured, does not seem to have occurred to the projector. The advantages of the present mode of stereotyping will at once occur to the reader. Since stereotyping in the present form was first commenced, many improvements have been made. But the original suggestion dates back over a century, and perhaps farther than that.

Another curious fact is that in 1764, Dr. Franklin, or his friends, "struck oil" without knowing what it meant. Gentlemen in New Jersey informed him that by applying a lighted candle to the surface of certain shallow brooks or ponds, the flame would catch and spread on the surface of the water. Of one of the experiments Dr. Franklin writes: "The flame was so sudden and so strong, that it catched his ruffle and spoiled it, as I saw." Dr. Franklin imagined that "something like a volatile oil of turpentine might be mixed with the waters from a pine swamp," but was not quite satisfied with this supposition. The Doctor took this story to England with him, but "it was not much attended to."

In 1765, there was read at the Royal Society, England, a paper from Rev. Dr. Finley, president of Princeton College, New Jersey, detailing the same facts. The paper was not published in the transactions of the Society, as the members thought it too strange to be true, and feared the ridicule of the public. This incredulity was hardly to be wondered at, since the "experiment" required that the creek should be shallow and the bottom muddy, and that mud should be stirred with a stick. It was supposed that in this way inflammable air was released or evoked from the mud under the water; the fire being held to be latent in that rather moist conductor. A curious fact in connection with the matter was, that Dr. Franklin, accepting the fact of the flame on the surface of the water, and wishing to prove the theory, or to construct another, groped in English ditches with his walking stick. The only result produced was on the Doctor in the form of an intermittent fever. Of course, the whole thing is clear to the present generation as the light from a kerosene lamp. Wonderful were the guesses in which the "scientists" of the last century strove to solve the enigma. The New Jersey experiments mentioned by Dr. Finley were made at some point "at a few miles distance" from Princeton. This does not give the direction. But if our Jersey friends wish to ascertain whether they, too, can "strike oil," they will find the only published part of Dr. Finley's paper in Sparks' Works of Franklin, vol. vi. at page 416. It would be worth while to know whether, in places where the kerosene existed in 1765, it can now be found, or whether the volatile product changes its outlet.

A plan of producing brass or bronze tubes with a copper end has been patented by M. E. Mappelebeck; it consists in first pouring a given amount of copper into an ingot, then immediately afterward the necessary quantity of brass or bronze. The ingot is then drawn into a tube in the usual way. It is recommended that the ingot shall have two lips at opposite sides, so that one metal shall be poured in on one side the other on the other.

The following treatment of tin scraps is described by M. A. Dupont. Dissolve the tin in a hot bath of diluted sulphuric acid, decant the liquor produced, and submit the salts contained to crystallization. The sulphate of iron is partly precipitated, and may be collected. Then place a piece of zinc in the liquid, which will precipitate all the tin in the spongy metallic form. The remaining sulphate of iron may be obtained from the solution by repeating the former operation. The spongy tin may be fused, or, if well washed in several waters, it will serve for producing salts of tin.

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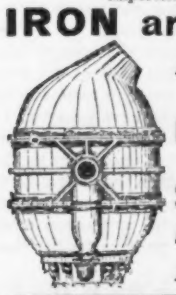

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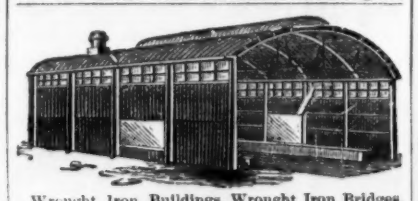

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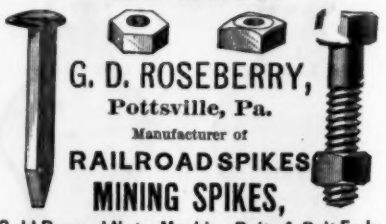

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Lyon's Dovetail Steel Headed Rails.

The Atlanta, Ga., Rolling Mills are making a specialty of dovetailed steel headed rails, which are said to be meeting with much favor among the managers of Southern railroads. The manner in which this rail is made is shown in the accompanying illustration, Fig. 1 representing the pile and Fig. 2 a section of the finished rail. The invention, covered by the patent granted to Mr. Edwin D. Lyon, Jr., of Sandusky, Ohio; consists in a peculiarly constructed pile or fagot, from which is obtained, by rolling, an iron rail with a steel cap covering the top and sides of the rail head, and secured in place by a longitudinal dovetail. The pile is bent as follows: B B are two old rails cut the required length of the pile, and placed side by side. A is a rolled piece of damper or puddle steel, rolled in the shape shown, so as to fit between the heads of the rails B B, and also on top of the same. Below the steel piece A, and extending down to the base of the rails B B, is a solid piece of iron, C, obtained from the crop end of the rail at the saws, and which are rolled without reheating. The rails B B rest upon flat pieces D

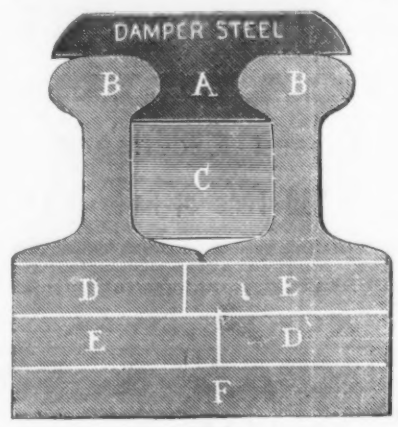


Fig. 1.

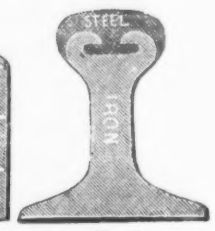


Fig. 2.

D and E E, which are made from old rails cut the required length, placed in a furnace, as many as five tons at once, heated to a cherry color, and by the aid of a small break down roll the pieces required are quickly produced. The whole rests upon a flange piece, F, rolled from common iron. This pile being carried through the ordinary process, produces a steel capped rail of the form shown in Figure 2, being the rail proper, and the steel cap covering the top and sides of the head of the rail, and united thereto by a dovetail, *a*, so that the iron firmly clinches the steel, and will hold it secure in spite of expansion and contraction. This rail also forms a reversible rail, which, when placed on a curve, and the steel worn on one side, can be turned around, and thus perform double service. In the construction of the pile there is an opening in the middle, which enables the heat to penetrate the pile, and the middle thereby gets hot as quick as the outside of the pile, thus effecting a considerable saving of coal.

The inventor claims that a rail rolled from such a pile can be made as homogeneous as it is possible to make any rail. The well known complaint of lamination and soft places in the wear of iron rails, proves them an early failure as compared with steel, and the increased demand for the latter is not to be wondered at. The damper steel is made in the usual form of puddling furnace.

The Cyrfarthfa Iron Works.

The first blast furnace at these works was, we believe, built by Anthony Bacon in 1770. At present the works include seven furnaces 50 ft. high, and some 14 ft. 6 in., and others 17 ft. diameter at the boshes. The furnaces are all blown with cold blast (blast heating stoves are, however, in process of erection), and all, with the exception of one, have closed tops fitted with the bell and hopper, the gases being led off to heat the boilers. The seven furnaces are built in a row against the hill side, the coal and ore being brought by rail to the high ground a little above the level of these tops, and the coke ovens and calcining kilns being also on the level, the kilns being situated close to the tops of the furnaces. The ranges of coke ovens are very extensive, and some of these ovens are provided with a steam discharging apparatus, consisting of a ram forced through the oven to be discharged by a small steam engine running on rails laid down in front of the ovens. This is an arrangement much used on the Continent, but comparatively rarely met with here. At the time of our visit the whole works presented a most melancholy appearance, the men being out on strike, and all the furnaces being blown out, with the exception of the open-topped one, which was being run making foundry pig. Mr. Crawshay is letting his works stand rather than give in to the demands of his men, and we are convinced that he is fighting a good cause, for it appears that it is only by such stoppages that the men can be brought to a clear understanding of the fact that demands for unreasonable prices for labor have a damaging influence on our whole iron trade, and render it impossible for our iron masters to profitably meet foreign competition. A notable feature at Cyrfarthfa is the manner in which the puddled bars are piled, the piles being built up so that they have sloping roofs and look, at a distance, like rows of small cottages. Of the rolling mills there is nothing to be said save that we noticed one train driven by an oscillating engine.—*Engineering.*

A new car shoe, invented by Mr. Stettson, of Minneapolis, was lately tested in that city with good results. It is intended to prevent the jumping of cars from the track, and consists of a clamp-like arrangement which is affixed between the wheels of each truck. This runs about two inches above the rail, and if anything happens to throw the wheels from the track, the clamp at once grasps the rails, holds the car on the track and brings the train to a halt very quickly. During one of the experiments at a curve in the road, on a down grade, a rail was removed from the track. The car having the shoe on was started down the grade, its speed being not less than thirty miles an hour. On reaching the gap the wheels jumped the track, the car settled down upon the shoe, which at once grasped the rail which had not been removed, held the car in an upright position on the track, and finally brought it to a standstill in a distance of two hundred and fifty feet. At a second trial, with a speed of fifteen miles an hour, the same result was accomplished, the car being brought to a halt in thirty feet.

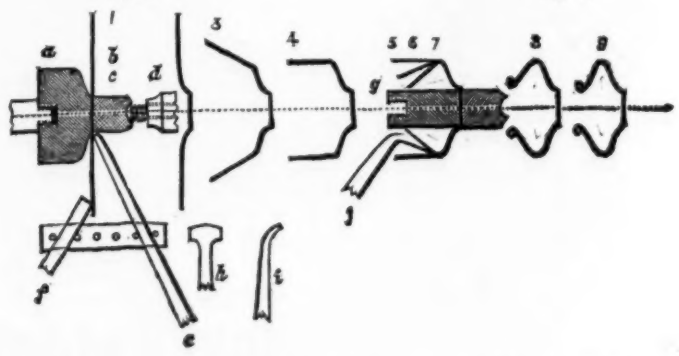
The Waste of Coal.

In the address lately delivered by Mr. F. J. Bramnell, before the British Institution of Mechanical Engineers, we find the following: It cannot be doubted that we have been and still are, although I believe and trust we are improving, most cruelly wasteful, and, as I have said, wickedly wasteful. It pains me when I hear a man talk of "only a bit of coal;" he cannot think of what he is saying. "Only a bit of coal!" Only a bit of that which might have helped to gladden some man's fireside. "Only a bit of coal!" Only a bit of that which if not wasted but properly used might have helped and might have succeeded in saving some noble vessel with all its brave crew from perishing on a lee shore. "Only a bit of coal!" Only that which might have assisted in wringing the bright metal from the sullen dross with which it had been associated for countless ages. "Only a bit of coal!" Only that which has been got at the peril of men's lives, and not at the mere peril but at the actual cost of men's lives, for ten men die violent deaths for every million of tons raised. "Only a bit of coal!" Only part of the store which the Almighty had buried in the recesses of the earth to be treasured up there for the use of generation after generation. It really is grievous to hear men talk slightingly of "only a bit of coal"; and I think it becomes us mechanical engineers, by precept, practice and example, to do all that lies in our power to cause persons to respect and to understand the value of that which they have but too long lightly treated and grossly abused.

Spinning Metals.

The capability which many metals exhibit of being spun into various shapes on a lathe, is due to their malleability, and the facility with which the operation can be performed is in proportion to this peculiar property, beside having relation to the hardness of the metal. Spinning or burnishing to form, is very extensively practiced, especially in the manufacture of such articles as teapots, plated candlesticks, oil cans, covers of cups and vessels, the bell mouths of musical instruments, and numerous other objects made of thin metals. Plated candlesticks are thus formed of several parts soldered together, or retained in position by the fittings of their edges, the whole being strengthened by a central wire, and by filling the entire cavity with a resinous cement. Figures 1 and 2 are to show the mode of spinning the body of a Britannia metal teapot, from one unperforated disk of metal.

Fig. 1. *Fig. 2.*



The wooden mold, or chuck *a* (see illustration) is turned to the form of the lower part of the teapot, and a disk or blank of metal *b*, is punched tight between the flat surfaces of *a* and *c*, by the fixed center screw *d* of the lathe, so that *a*, *b* and *c* revolve with the mandrel, and now by means of a burnisher *e*, which is rested against a pin in the lathe rest, as a fulcrum, and applied near the center of the metal, and a wooden stick *f*, held on the opposite side to support the edge, the metal is rapidly bent or swaged through the successive forms 1, 2, 3 to 4, so as to fit close to the curved face of the block and to extend up its cylindrical edge. The mold is next replaced by *g*, figure 2, a plain cylindrical block of the diameter of the intended aperature. One of various forms of burnishers (*h i*, some bent, others T form, and so on, the surfaces of which are slightly greased) is used, together with the hooked stick or rubber *j*, first to force the metal inward, as shown at 5, 6, 7, and also to curl up the hollow bead which stiffens the mouth of the finished vessel 9. The molds are sometimes made of the entire form of the inside of the work, but of several pieces, each smaller than the mouth; so that when the central block is first removed the others may be successively taken out of the finished vessel, like the parts of a hat-block or a boot-tree.

It is very important that the edge be kept exactly concentric during the whole process, and entirely free from notches, and for this purpose it is occasionally touched with the turning tool during the process of spinning. The operation is very rapid and interesting, and is very similar to the method adopted by a potter, who forms a bowl or vase with a contracted mouth, in a manner completely analogous, although the yielding nature of the material he works with requires his fingers only, and neither the mold stick or burnisher.

The lenses of optical instruments are fastened by similar means, the thin edge of the metal being curled over the glass by a burnisher applied whilst the ring revolves in a lathe.

The tendency of the process of spinning is, of course, to make the metal thinner toward the extremities of the article under manipulation than the center, and great care and skill are necessary on the part of the workman, in order to keep the metals of uniform thickness.

In the manufacture of brass kettles and other large vessels, machinery has been introduced to do the work of the burnishers, but the general principles which regulate this branch of the manufacture are essentially the same as those which obtain in the lighter branches, the difference being that by the use of machinery a much greater force of pressure can be brought to bear upon the metal than would be otherwise possible. The metals most commonly used in the manufacture of spun goods are copper, brass, pewter and block tin.

Elasticity of Masonry.—The bridge at St. Louis has three main spans—a center span of 520 feet in the clear, and two side spans of 502 feet each, with heavy stone abutments and stone piers. The system of the superstructure is that of the upright arch, exerting a thrust on the abutments and piers. It was a question of interest to the engineers making the tests whether the thrust created by the movable load on one side span would have a perceptible effect on the pier. Mr. C. Pfeifer, the manager of the Keystone Bridge Company, states that the crown of the arch over the middle span was observed to rise one-quarter inch when fourteen locomotives were brought on the side span, and to come back to its former elevation as soon as the load on the side span was removed. The experiment proved that the thrust from these fourteen locomotives was sufficient to cause a horizontal deflection of the pier of about one-twelfth of an inch. This deflection must have taken place in that part of the pier extending from the spring of the arches down to the depth at which the pier may be considered firmly imbedded in the sand of the river bed, which I estimate at about 65 feet below the spring of the arches. This part of the pier is, on an average, about 36 feet wide and 65 feet long, and consists of the very best class of masonry, laid with large stones in hydraulic cement. The stone is magnesian limestone, from the quarries at Grafton, Illinois. Above low water the pier is faced with granite.

The London *Daily News* says that a Dr. Jones, of that city, has lately succeeded in making wood fire-proof by subjecting it to a pickling process in a solution of tungstate of soda and water. The tungstate, according to the report, "is made by the addition of tungstate of lime to hydrochloric acid and salt, and it produces in the process as much chloride of lime as will pay working expenses." The ordinary experiments with piles of wood and with houses built of "pickled" and of ordinary lumber were made with perfect success, and then we are told that a sheet of "pickled" brown paper was pasted over a partially filled keg of gunpowder, which was surrounded by lighted petroleum and shavings for more than an hour without any disastrous result. Finally lighted shavings were thrown into the keg, separated from the powder only by the sheet of brown paper, and the powder failed to ignite. The gunpowder was afterward taken out and exploded. If there is any one objection to Dr. Jones' invention it is that it is too good. Apart from the powder experiment it is alleged that the pickling solution will make pine wood as hard as oak or teak, and that it will restore wood that has been ruined by dry rot to its original durability.

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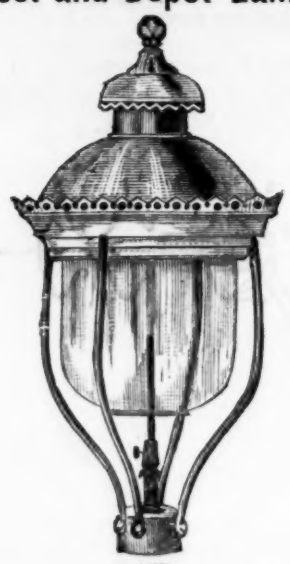

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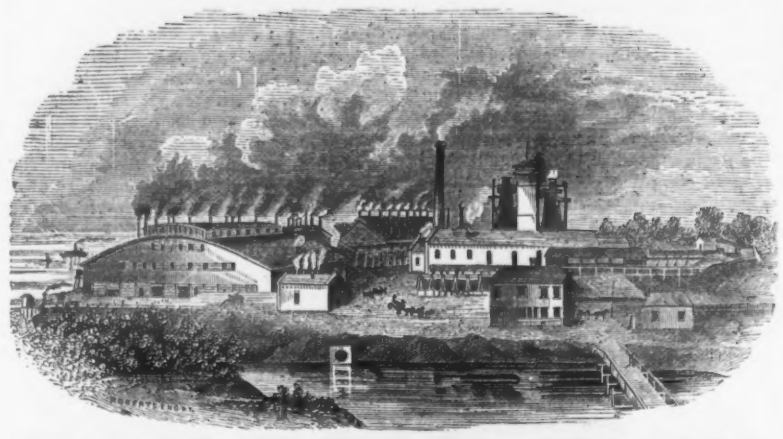

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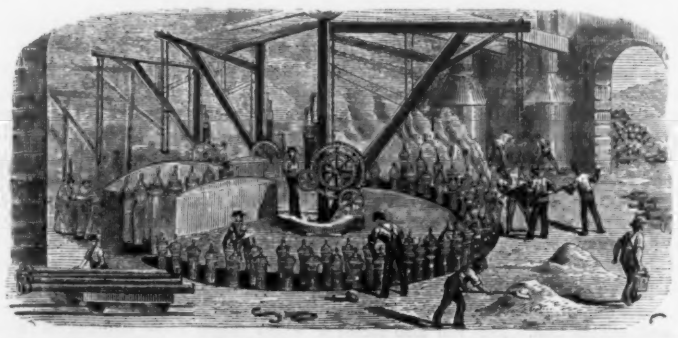

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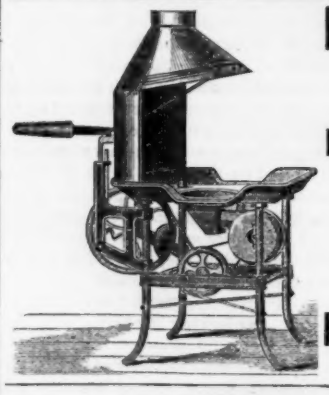

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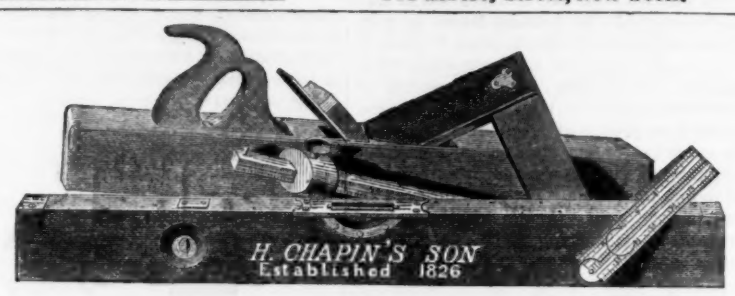

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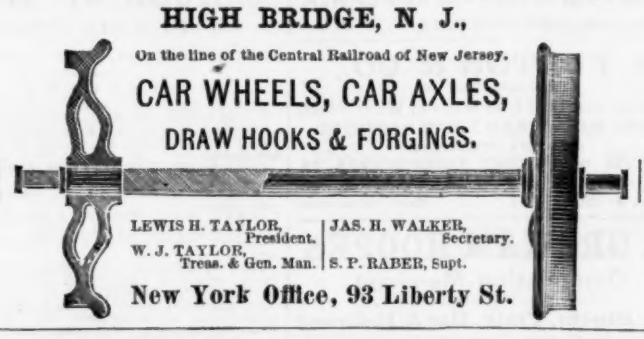

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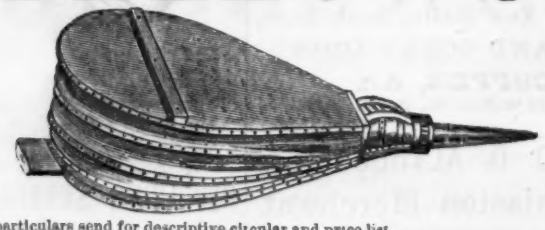

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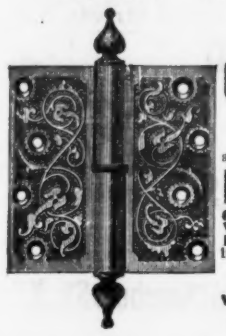

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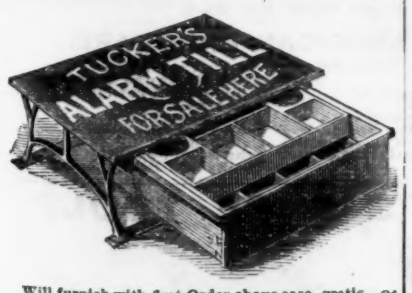

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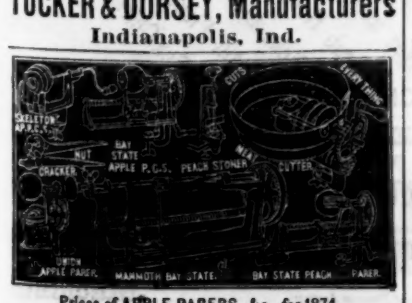

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The Physics of Metallurgy.

At the annual meeting of the Societe des Ingenieurs, which lately took place in Paris, the retiring president, M. Molinos, briefly reviewed the progress of the past year, and gave place to his successor, M. Jordan, who then delivered an interesting lecture on the metallurgy of the future, viewed mainly in its physical bearings. *Iron* gives the following substance of this lecture:

We have certainly all remarked that, as the metallurgical arts have progressed, the more has the science of fire assumed importance in their operations; and to the man who can develop and utilize the highest temperature, honor and profit are justly awarded. We have witnessed many efforts in this direction. An incessant duel has been going on between fire and the refractory matter treated; and the duel recalls another which is equally being fought out on the metallurgical arena (for, in truth, it is industry that here operates, rather than the military art)—the duel between artillery and armor plates, which calls forth the most delicate resources of the metallurgist and the smith. In this Homeric duel, which has already had so many phases, the superiority, up up to the present, rests with the attack; the ball has always at length triumphed over the plate; and it seems to be the same in the battle between fire and refractory matters, of which I now speak.

Most of the metallurgical apparatus in which heat is developed and utilized belong to two great categories, blast furnaces and reverberatory furnaces. The high or blast furnaces are among the oldest instruments of the metallurgist; iron, lead, copper tin, were formerly produced only by such. The reverberatory furnace has come to displace the blast in the refining of cast iron and the manufacture of copper. More recently, the blast seemed to have taken revenge since the invention of the Bessemer process; but through the genius of the Siemenses the reverberatory furnace presently regained the lost ground in siderurgical work. At present, the Bessemer converter, fed with compressed air, and Martin-Siemens' reverberatory furnace, heated by gas and with natural draught, concur, or rather lend mutual support, in modern steel works. The two apparatuses are two types to which may be referred all possible means, known or yet to be discovered, for obtaining high temperatures.

The more one analyzes the marvelous invention of Bessemer, the more is one struck with the manner in which it came forth "fully armed," so to speak, from the head of its happy inventor. When, in 1856, the celebrated lecture "On the Manufacture of Iron and Steel without Fuel," was delivered to the British Association at Cheltenham, a completely novel and most fruitful idea was thrown into the industrial world. The heating in the converter is done simply by intermolecular combustion of the elements of the iron itself, this combustion being at a pressure higher than the atmospheric, and the utilization of the heats thus produced in the heart of the metal is direct and immediate. The bath absorbs it at first hand, and yields only a small part to the walls of the apparatus.

Mr. Siemens' system of heating is quite different. It is by means of combustible gases, produced by distillation and imperfect combustion of the coal. [Mr. Jordan briefly describes the process.]

The temperatures obtained in a furnace heated by gas on the Siemens system, or by other like systems, cannot exceed certain maxima, which I will endeavor to appreciate. The experiments of our eminent chemists, MM. Saint Claire Deville and Debray, have shown that if we bring together, in the proportions exactly necessary to form water, the two gases, hydrogen and oxygen, at ordinary pressure, taking care that none of the heat produced is absorbed by the walls, the maximum temperature really obtained is only about 2500°, instead of 6903°, the number Peclet got from calculation. This is readily explained by the fact that only half of the hydrogen has entered into combination. At 2500° steam has a tendency to be decomposed, equal to the affinity which hydrogen and oxygen have at this temperature, or (in more scientific language) at 2500° the tension of dissociation of steam is equal to the atmospheric pressure. Whatever, then, the initial temperature of the two gases brought together, we can never obtain from them a temperature of combustion higher than 2500° (or 2800° according to Bunsen). But if one could produce the combination at a higher pressure—two, three, four, or more atmospheres—we are warranted by past experience in saying that the proportion of gas entering into combination would increase, and the temperature of combustion be raised, in proportion to the increase of pressure.

The temperature of total combustion, which Peclet determined by calculation, for carbonous oxide and oxygen, is 7059°; but the tension of dissociation of the carbonic acid formed is already pretty strong (according to M. Deville about 1200°). The temperature at which this tension is equal to atmospheric pressure, that is to say, at which carbonous oxide and oxygen can no longer combine, has not, I know, been determined experimentally; but it is certainly below 7000°, and probably below 3500°. The presence of nitrogen, also, if the combustion takes place in air, has the effect of diminishing the temperature. Thus (notwithstanding the respect I entertain for the great name of Faraday), I doubt if it would be possible to obtain a temperature of 3850° C. in a furnace heated by the combustion, by means of air at ordinary pressure, of a gas containing itself more than two-thirds of inert elements.

For the rest, it may be remarked that in the Siemens furnace the metallic bath absorbs only a small part (15 to 20 per cent.) of the heat produced, the remainder is spent by the furnace itself in transmission by its walls and evacuation by the chimney. A flame with small weight and calorific capacity, and which is in contact with a surface of bricks more extended than that of the bath, cannot rapidly furnish a sufficient number of calories, and a rise of temperature sufficiently fast, notwithstanding loss of transmission, for the metallic bath to reach a temperature equal to that of the flame.

According to a Belgian professor, M. Kranz, who has carefully analyzed the Siemens furnace, the mean temperature of the flame at its entrance into the furnace may be 3023° (but he did not here take into account the dissociation of the carbonic acid, which is very considerable at this temperature), and that of the furnace itself 1800°. This may probably be considered the maximum.

The entire pressure in the Bessemer converter, in consequence of the smallness of the orifice through which the gases escape, sometimes exceeds ordinary pressure by half an atmosphere. Further, the carbon of the iron is burnt, and carbonaceous oxide is formed, which is dissociated less easily at high temperatures than carbonic acid. The silica resulting from combustion of silicium is no longer decomposed, and remains in a fluid state in contact with the bath. Thus, a higher temperature can be obtained than in the Siemens furnace—a temperature which may be estimated at 2500°.

Mr. Bessemer has appreciated the importance of combustion under high pressure, and not long ago (1869) he devised apparatus for realizing it—a sort of converter, or cupola, closed hermetically, into which he forced air at a pressure of two and a half atmospheres, and from which the gaseous products of combustion could issue by a narrow orifice, which could be graduated at will. He succeeded thus in smelting iron with a small quantity of fuel, but the contact of carbon hindered his obtaining metal sufficiently soft; it produces always a troublesome carburation. He has abandoned his first apparatus, and adopted a furnace in which the fuel is no longer in contact with the metal, and which is a sort of reverberatory furnace with hermetic envelope.

What has been said will suffice, I trust, to justify the enunciation of the two following problems, in which I sum up the conditions to be fulfilled, in order to obtaining temperatures still higher than those at present realized:

1. To choose or invent a fuel which may be burnt in the hearth of a metallic bath without altering the properties of this, and will furnish, if possible, a non-volatile residue.

2. To devise an arrangement of furnace, heated by gas or otherwise, which may be worked at a pressure of several atmospheres.

It is impossible to foresee the changes that may take place in metallurgy from the use of higher temperatures than those at present in use. An eminent English physicist, M. Lockyer, has shown from his spectroscopic researches, that, in the hotter stars, there is only pure hydrogen; in those that are less hot, metals appear; in others, still cooler, are to be found metalloids; and, lastly, in the earth, which is an extinct star, there is no longer free hydrogen; there are few free metals and metalloids, but a host of compounds more or less complex. We see that M. Lockyer tends to consider hydrogen as the limit of all dissociations, what Balzac called the absolute (in a well known romance), what others call cosmic matter; and that all substances may be metamorphoses or transmutations of hydrogen due to different circumstances of temperature, pressure, electric state, etc.

It is, however, little probable that we shall ever see the number of the elements reduced to unity; shall we even be able to dissociate, *e. g.*, iron and oxygen, iron and phosphorus, by the sole action of heat? There is no reason to hope so. But, just as the Bessemer and Siemens' apparatus have put at our disposal steel cast in large masses, so we may yet find still more energetic means of obtaining metals in molecular states now unknown. It is in this region that I should like to detain you a little further. Molecular mechanics is still in its infancy; and it presents a field that is fertile in research and experiments. We are now acquainted with iron, *e. g.*, in many different states. We know how to obtain cast or wrought iron, or steel. But how much has yet to be ascertained ere we can know all the properties of the different states of iron; explain the peculiarities they present with reference to their use in construction; or determine the relations which exist between the molecular states and the resistance of the metal to different treatments. This science, which one may term the physics and molecular mechanics of iron, is still but rudimentary. To convey to you some idea of what I anticipate in these molecular studies, I will take the case of a well-known phenomenon.

We all know the process of welding. If we heat two pieces of iron to what is called welding heat, and hammer or press them together, they are welded into union. Why? The only explanation one finds in the best works on chemistry and metallurgy is the following: At white heat iron acquires the property of being weldable, and it shares this property only with platinum. But we have here to do not with a mysterious or particular property of iron, *weldability* (*soudabilite*), but only with the fact of a general cause, the manifestation of a molecular property which may be elsewhere met with in nature. Take two pieces of ice at a temperature a little above zero, and apply them, lightly even, to each other; we presently find they have united. This is the phenomenon of *regelation*, studied in such an interesting way by Faraday, Tyndall and Thomson.

Thomson has explained it thus. In the case of substances, which, like water, have the property of diminishing in volume when they liquefy, pressure tending to approximate the molecules lowers the temperature of the point of fusion; consequently, in pressing the pieces of ice against each other fusion takes place between the surface of contact at a temperature below zero; and immediately the pressure has ceased, solidification occurs, and the two pieces are united.

The welding of iron, it seems to me, is a phenomenon exactly similar. The two pieces of iron are raised to a white heat—that is, to a temperature (more or less) near the point of fusion. The repeated blows of the hammer (or the pressure of the roller) lower the point of fusion, and cause superficial liquefaction of the parts in contact, and so, welding; for iron, like water, dilates in passing from the liquid to the solid state. Several other metals do so, and they might be welded like iron if other circumstances did not come in to hinder the manifestation of this property. Platinum is easily welded at red heat because its little oxidable surfaces yield, like those of ice, to superficial fusion. Iron, to be welded well, requires that its surface should be free of oxide. Phosphoric iron is more easily welded than pure iron because its point of fusion is at a lower temperature. Steel, which is more fusible, is welded also at a lower temperature; but the manipulation is more difficult. Silver has the same property as iron and platinum of dilatation in solidification. It melts at a cherry red heat; but molding is preferred to welding. Bismuth and zinc are in the same case as those mentioned; but they are so fragile in the neighborhood of their point of fusion, that it is not sought to weld them by hammering or pressure.

From what has been previously stated, we see that iron, on being welded, only follows the example of water; and I will now add that the comparative study of these two substances, so unlike in many points, is full of suggestion to the metallurgist. I read lately an excellent work of M. Tyndall's on glaciers and the transformation of water, and I was struck with the great number of analogies—I would even say resemblances—though the two points of fusion are distant more than 1500° C. from each other.

When snow is at a temperature not lower than 0°, the children amuse themselves by making large snowballs, which increase in volume as they are rolled along, the simple weight of the ball sufficing for the agglomeration of successive additions of snow. If we take a snowball and compress it in our hands, a hard, white, opaque mass is had; but if the pressure be considerably increased, we at length obtain a piece of transparent ice (supposing we have succeeded in expelling the least traces of air between the crystals of snow). If some pounded ice be put in a mold with cover, and strongly compressed, either by the blow of a hammer or by pressure, a mash will be obtained (if the temperature of the ice is near 0°) having the form of a mold; and one may, in such ways, model a piece of ice so as to have any form one likes.

Do we not find, in these processes, the work of the puddler when he makes his ball, in rolling up the crystals of iron that have formed in the heart of the scoriæ; then shingling, and the expulsion of the liquid scoriæ from between the crystals of iron by pressure or shock; then stamping, forging? When we forge a piece of iron raised to white heat, it seems to behave like a viscous body; it spreads out in different directions; it behaves, in fact, like the ice of glaciers. The ice flows along in the glacier bed, and is molded according to the sinuosities; but this is because it undergoes a splitting (as has been observed), and that it is reunited immediately, through regelation, caused by the pressure of the mass behind.

If iron raised to a red heat permits of being forged, we know that it does not bear strong tractions. It is the same with ice; while it bears pressure, it is easily broken before being considerably elongated.

Physicists, such as Tyndall and Helmholtz, distinguish two kinds of ice—the ice of lakes, which is formed by a regular crystallization at the surface of still water, and the ice of glaciers, or compressed ice, which is produced from snow crystals or fragments of ice welded in one mass through regelation.

These two kinds behave quite differently under strong pressure. The former begins to be broken in various parts into a great number of pieces; the latter, amorphous ice, changes form, and is modelled by a series of scarcely perceptible splittings.

Try to forge, without precaution, an ingot of iron or cast steel, and you will soon break it, because it is crystalline. But if you submit it to the operation of sweating—that is, if you heat it to a welding temperature, and then, by strong pressure, produce the welding, by regelation, of the various crystals of the metal—you will have a mass which may be forged without difficulty, and of which you may weld the fragments where the pieces of the original ingot are not welded.

The iron formed in the puddling furnace is crystalline; it becomes amorphous by shingling and beating out. Steel cast at a temperature near its point of fusion, and allowed to cool gradually, crystallizes also like the ice of lakes. I need not say that it is not the same crystalline system: nor recall the fact that iron and carbon are isomorphous). Iron and soft steel, even after the forge, which has welded together all the crystals and destroyed the crystalline structure, may crystallize anew under different influences. I saw lately a piece of a steel cannon which had been left in a welding furnace; on coming out it was nothing but a friable agglomeration of well characterized crystals. A piece of compressed ice being kept a long time in a stagnant atmosphere (so as to hinder evaporation), and passing by alternations of temperature from 10° to 0°, *e. g.*, several times, would it become cleavable? I do not know if the experiment has been made, but it would be worth while making.

We may notice further how the view held by M. Helmholtz in opposition to M. Tyndall, with regard to the innumerable splittings produced by pressure, which produce the molding of the granulated ice, and its flow through the hole of the draw plate, under the action of a hydraulic press (as Helmholtz lately showed), the flow of ice being thus reduced to the flow, simply, of a multitude of small polyhedra; how this view, I say, resembles that first enunciated by M. Tresca (if I mistake not) as to the laws of flow of solid bodies.

In considering these two states of iron, the crystalline and amorphous, we are strongly urged to inquire what occurs when the metal passes from the one to the other. The experiments of MM. Favre and Silbermann, and of M. Ditte, have shown that substances liberate heat in crystallizing, and that, on the other hand, they absorb it in passing from the crystalline to the amorphous state. This latter seems to be intermediate between the crystalline state, which is the true solid state, and the liquid state; it is a dynamical state, as I have seen it defined, a state of more or less unstable equilibrium.

Has the crystalline iron which comes forth from the puddling furnace, and which we transform into amorphous iron by shingling and welding, absorbed heat? Has it rendered latent a part of that furnished by the furnace or developed by hammering? Are the specific heats of crystalline iron, and of forged iron, the same at the same temperature? These are questions which appear to me highly interesting, but which have not yet been answered.

Might this absorbed heat, on being afterward liberated, in circumstances which are imperfectly known, bring back the iron to the crystalline state, and explain the changes of structure attributed to intense cold, vibration, &c.? I have seen a piece of good iron (Franche Comte), which has been left some weeks in a welding furnace, and had thus undergone strong heatings, followed by very gradual coolings; it had taken a structure completely and largely crystalline, while attaining its original softness. The large pieces of the forge, the sheetings, which are put several times into welding furnaces, and which gradually cool after each heating, under the repeated blows of the hammer, are liable to crystallize in the central parts which the effect of the blow does not reach. To remedy this, and to prevent ruptures, it is necessary, when the piece has been completely formed, not to let it cool to the heart, but to put it in the furnace until the exterior has taken a red temperature, then bring it back and dip it in water, which may be hot for small pieces, and is cold for large pieces, as sheetings; without this preparation, a plate of good soft iron would break, with large facets, under the shock of a ball, instead of resisting it. This dipping of iron pieces, further, does not succeed, unless the iron is soft. It is not necessary that it be hardened by carbon or phosphorus. The quick cooling of amorphous iron appears to hinder the crystals developing, while very slow cooling seems to have the contrary effect.

If, instead of considering solid water or iron, we consider them in the liquid state, there are other curious points which may be noticed.

We know that water may be brought even to −12° without ceasing to be liquid, if it be left in complete repose, especially if sheltered from the air; but vibrations, such as those produced with a blow on the vessel, or the contact of a small fragment of ice, quickly give rise to solidification. The point of fusion is fixed, that of solidification is not. Water may solidify at several temperatures. It solidifies more quickly the further the temperature is below that of the point of fusion, liberating the greater quantity of heat. When the solidification occurs thus suddenly, the molecules have not time to take their positions of stable equilibrium, and crystallization cannot operate.

Now, have these phenomena of surfusion their analogies in the case of liquid iron? Might we not here make some curious comparisons with what is observed in the casting of iron or of steel? The temperature at which steels are solidified has certainly a considerable influence on the grain. We know the practice (in the case of certain steels) of hermetically closing the ingot mold immediately the metal has been cast, and leaving it to rest till solidification is supposed to be complete. It is known that when steel is hardened in ingot molds which are in motion the structure seems more massive and less crystalline.

THE NICHOLSON FILE.

All Nicholson Files are cut with the Patent *Increment Cut*, an invention owned and controled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformityof machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

NICHOLSON FILE COMPANY,
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The American File Company have the exclusive right to use the Bernot process for cutting files By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

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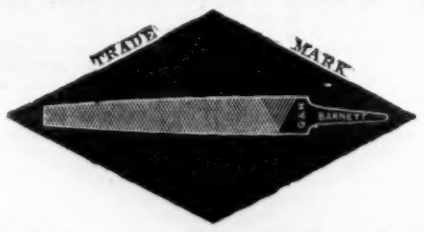

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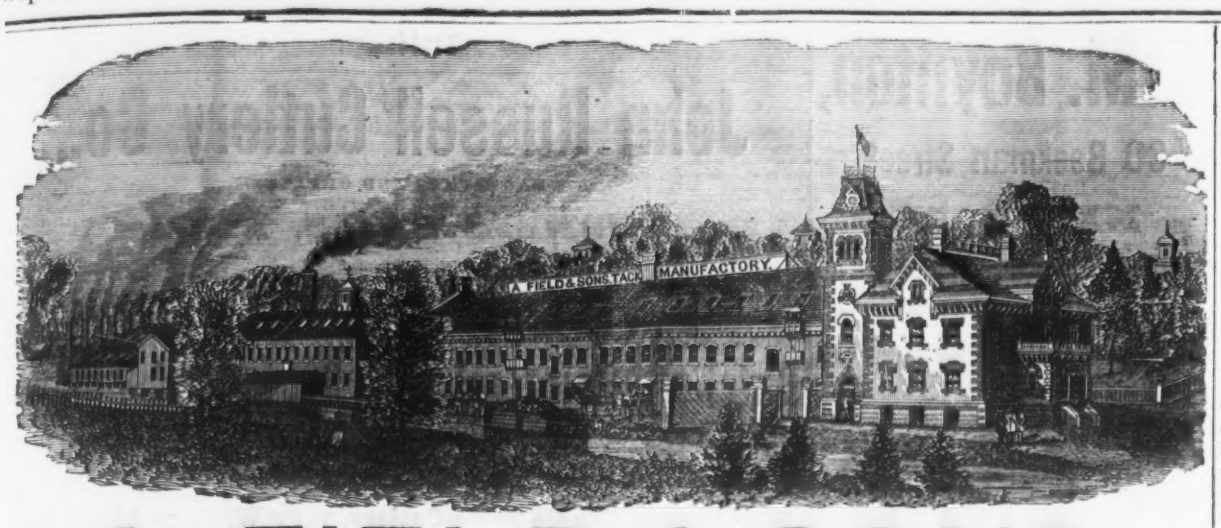

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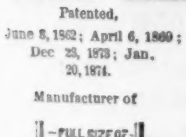
Patented,
June 5, 1862; April 6, 1869; Dec 23, 1873; Jan. 20, 1874.
Manufacturer of


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American Chain Cable Works.
Thirty years' experience in the business.

KENDRICK & RUNKLE, Trenton, N. J., Manufacturers of Cable, Crane, Car Brake, Agricultural Machine and Harness Chains of every description. Also, sole manufacturers of KENDRICK'S PATENT IMPROVED TRIPLE COAL MINE SLOPE CHAIN.
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Manufacture Iron Chain of every description.
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Without straps or rivets, of the best English and American Cast Steel. Every Shovel warranted. Printed lists of prices and discounts to be had on application at the office.

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BUSINESS ITEMS.

NEW YORK.

The Wood Mowing Machine Company, of Hoosick Falls, are filling an order for ten thousand mowers and reapers to be sent to England.

NEW JERSEY.

Work has been resumed at the Royalty Locomotive Works, at Paterson. A number of new hands have been placed at work.

PENNSYLVANIA.

The Lackawanna Iron and Coal Company's steel works, at Scranton, will probably be completed by the first of December. The works will be extensive, consisting of a cupola room 44 feet span, 71 feet long, and 49 feet high to eaves; a converting room 84 feet span, 124 feet long and 31 feet high; an engine room 54 feet span, 77 feet long, and 16 feet high; a boiler room 49 feet span, 73 feet long, and 16 feet high to eaves. All these buildings will be arranged so as to form a rectangle of 12x202 feet. Two five ton converters will be located in the converting room of eight feet external diameter and fifteen feet high.

The Millerstown Iron Company have started all their ore mines, which is an indication that the furnace will be put in blast before long.

MASSACHUSETTS.

A new enterprise in gun making is in progress at the Springfield Armory, Mr. James Lee, of Milwaukee, having secured from Congress an appropriation of $10,000 for the manufacture of guns upon his model, for experiment in the field. Mr. Lee's gun was before the small arms examiners in Springfield a year and a half ago, and stood all the tests to the one of excessive charges, when a piece of the mechanism broke. Mr. Lee promptly remedied the difficulty, however, and taking his gun to Congress last winter so satisfied the Military Committee upon its merits as to secure from them an appropriation of $10,000 for its trial. The gun in question is of extraordinary simplicity in construction, having only fourteen pieces in its make up. These few pieces are so novel in arrangement that seventeen patentable claims are made upon them. There is only one screw and two springs in the gun, which can be fired thirty-one times in a minute, the highest number reached by any gun submitted to the small arms board. Mr. Lee intends to patent it in England for competition with the Martini-Henry rifle, which is already in disfavor among the English officers.

A company has been organized in Fitchburg, with a capital of $1,000,000, to manufacture sewing machines. The establishment will be known as the "American Staple Sewing Machine Factory," and already one-half of the necessary funds has been subscribed. These machines will be particularly adapted to sewing boot and shoe soles.

Arrangements are in progress at Smith & Wesson's, Springfield, for the manufacture of the 3000 Schofield pistols, recently ordered by the ordnance department. The order is the result of the experiments of the board of pistol examiners, in which the Schofield pistol made a better record than those of any other make. The arms will be manufactured at a cost of $13 each, and will be put into the field.

Tufts' Elevator Works, South Boston, are having a fair run of trade. They are furnishing the elevators for the new Union Club House, corner Fifth avenue and Twenty-first street, New York; also, an elegant passenger elevator for the Glenham Hotel, New York.

The Wason Car Company, at Brightwood, have begun running their machinery on half time. They have not before yielded to the stress of dullness; but as their present orders were nearly worked off, and no new ones coming in, it was found necessary to reduce, and until increased demand requires a change, the engine will be run only afternoons. The foundry is still on full time, and many of the employes not engaged at machines work at the old hours. The number of men is being reduced by frequent discharges, however. There is next to nothing being done in building cars, and there are hardly a dozen cars in the finishing and paint shop. Two were shipped last week, to go via St. Louis, to Texas, for the Galveston, Harrisburg and San Antonia Railroad, and two more and a mail car are being painted, making five in all, for this road. The Athol Road has one nearly done in the shop, the New York Central and Hudson River Road three or four, the Connecticut River Road one, the Utica and Black River Road one, and a Canadian road one or two.

CONNECTICUT.

At Naugatuck, the Tuttle Manufacturing Company are turning out large quantities of hoes, rakes, forks and other agricultural implements. The company has a branch in Auburn, N. Y., which is one of the most important manufacturing establishments in Western New York.

The Naugatuck Cutlery Company, at Cotton Hollow, has been in operation about two years, and makes a specialty of pocket cutlery.

MAINE.

The Bangor Edge Tool Company have just received a large trip hammer and other machinery in perfect running order, and will immediately commence making axes for the fall trade. They manufacture, with their improved facilities, about eight dozen per day, and they have also made arrangements for manufacturing a much larger quantity of cant-dogs than formerly.

The Bangor Daily *Commercial* says: A portion of the roof of the Bangor Foundry and Machine Company's foundry is to be covered with galvanized iron, to prevent the backing up of water in winter.

At Salmon Falls, near Calais, a fire lately destroyed the car shop belonging to the St. Croix and Penobscot Railroad. The building, containing the engine "Bristol," one old passenger car and three platform cars, was burned. Loss about $7000; insured for $4000.

MINNESOTA.

The movement in favor of home industry, at St. Paul, has led to the organization of a manufacturing and trust company with a capital of $250,000, designed to encourage local manufactures.

INDIANA.

A new brass foundry and turning shop has recently been started at Terre Haute, by Dickinson & Marland, two practical mechanics. Both mills at this place are in operation, single turn.

VIRGINIA.

The round house of the Chesapeake & Ohio Railroad Company, at Staunton, was burned lately, together with two engines which were in the building at the time. Loss, $50,000.

OHIO.

S. L. Gill, proprietor of the Columbus Car and Car Wheel Works, is now manufacturing eleven cars a day for the Baltimore and Ohio Railroad Company. There are three hundred men employed in the establishment, who, by means of new and improved wood working machinery, accomplish the same amount of work formerly done by three hundred and fifty hands.

All kinds of brass goods are manufactured at Jona. Smith & Co's., Toledo, beside which they turn out steam and water gauges, making these a specialty. The firm give employment to from 25 to 30 hands, and do an annual business of from $80,000 to $100,000. They have been established two years.

ILLINOIS.

The great rolling mills at Joliet, which have for some time been under a financial cloud, are at length sufficiently recovering from the difficulty to warrant their resumption, thus giving employment to several hundred workmen. Though much cramped, it is evident that the possessions of the company insure it against bankruptcy and the creditors against heavy loss. The citizens of Joliet have been very liberal and magnanimous toward this their greatest local manufacturing interest.

A. N. Bain & Co.'s Foundry, at Charleston, turn out about 10,000 stoves per year, and does a great deal of job work. A great amount of machinery for broom corn cleaning is made in the foundry and shops.

The Dowlais Iron Works.

A correspondent of *Engineering* thus describes a recent visit to the Dowlais Iron Works:

Dowlais, with its pits, gives employment to between 11,000 and 12,000 men. On entering the works the first thing examined was the new Ivor blast furnace recently started, and, in fact, not yet in full work. This furnace is 55 ft. high and 18 ft. in diameter at the boshes, and it is expected, when fairly at work, to run 300 tons of Bessemer pig per week. The furnace has a closed top, and in connection with it have been erected four of Whitwell's blast heating stoves of the latest patterns. The furnace is served by water balance hoists. Passing from this furnace down to the steel works the party had an opportunity of examining one of a class of handy little locomotives constructed by Messrs. John Fowler & Co., of Leeds, for yard work. These engines have a single cylinder on the top of the boiler, the crank shaft being connected to the trailing axle by gearing. In cases where heavy loads have to be drawn at a slow speed these small geared engines undoubtedly do the work more economically than engines of the ordinary type, and we expect that in time their use will be largely extended.

At the steel works we were first conducted to the regenerative gas furnaces used for the Siemens-Martin process. There are four of these furnaces, and in them are used up all kinds of steel scrap, crop ends, &c. In working these furnaces a bath is first made by melting about 30 cwt. of pig iron, and into this bath steel scrap is gradually fed; samples are then taken, and finally ferro-manganese is added to bring the metal to the quality desired, the charge of steel ultimately obtained being about six tons. The time occupied in working a charge is about ten hours. There are four of these furnaces at Dowlais, and they are arranged in a row on the straight side of a D shaped pit containing a ladle crane of the regular Bessemer pattern. This crane can receive the charge from any one of the furnaces, and the ingots are teemed precisely as in the case of the Bessemer process.

We were also shown a "blow" in one of the Bessemer converters, of which there are six in a building adjoining that containing the Siemens-Martin furnaces. The Bessemer converters at Dowlais, we may remark, are now blown by a very fine pair of vertical blowing engines constructed by Messrs. Daniel Adamson & Co. The "cogging" of the steel ingots is done at Dowlais in a reversing mill driven by a pair of engines of excellent workmanship, constructed by Messrs. Kitson, of Leeds. In these engines the moving parts have been kept as light as possible to facilitate rapid reversals, and the result appears perfectly satisfactory. The system of rollers by which the ingot or bloom is carried from the cogging mill to the saw which cuts it in two, and the saw itself, are also driven by engines constructed by Messrs. Kitson. Of the rail mills and other departments there was no time to make any examinations, and in reference to these departments the only detail we have to notice here is the hydraulic gear employed for hauling the blooms out of the furnace. For this purpose there is placed in front of each furnace thus fitted a short cast iron standard containing a hydraulic cylinder. The ram working in this cylinder carries a rack, and this rack gears into a pinion on a short shaft carried by bearings on the standard. At the end of this shaft is a chain drum, from which a chain is led off when required to the tongs attached to the ingot to be drawn. Water being admitted to the hydraulic cylinder, the ram is raised, the chain wound upon the drum, and the ingot drawn from the furnace,

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF

Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

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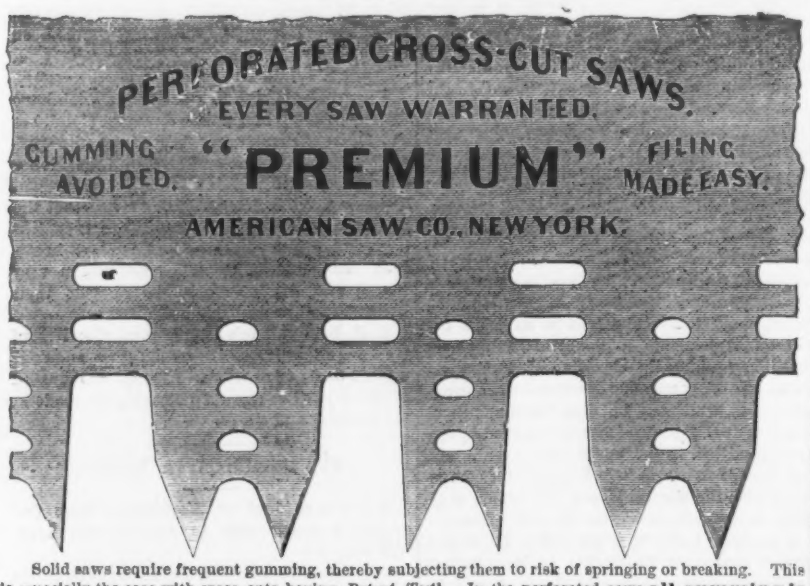
MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

TRENTON, NEW JERSEY.

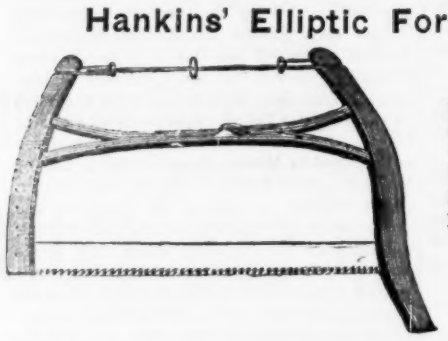


Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avoided** and the teeth are easily kept long and in *proper shape*, saving *files, labor, expense* and *vexation* As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,

VULCAN SAW WORKS,

WILLIAMSBURGH, N. Y.

THE SILVER STEEL

DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

Patent Secured

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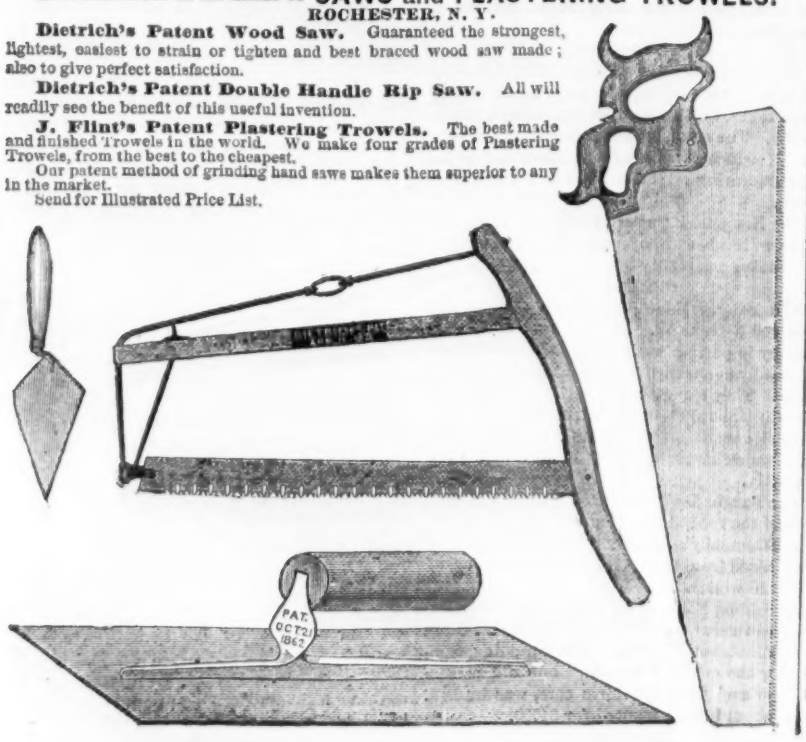

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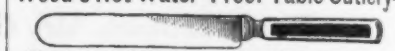

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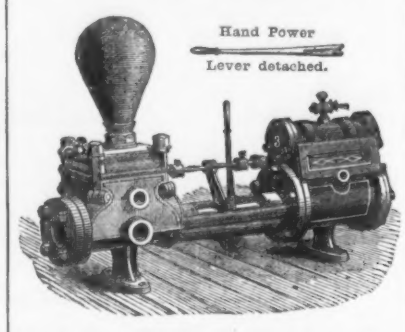
COMPACT!

SIMPLE! and

DURABLE!



Cut above represents pattern of No. 3 Pump, showing Hand Power attachment, for pumping when steam is down.

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Mining Pumps,—Piston or Plunger Pattern,
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Brewer's Water and Air Pumps,
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Tannery Pumps,
Marine Air Pumps,
Wrecking Pumps,
Oil Refinery Pumps,
Oil Line Pumps,
Blowing Engines,
Sugar House Pumps,
Vacuum Pumps—Fly Wheel Pattern,
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Plantation Pumps,
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Hydraulic Pumps,
Low Pressure Pumps,
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Combined Boiler & Pump,

Acid Pumps,—Of Pure Composition,
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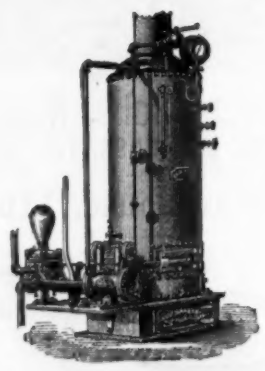

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CORRESPONDENCE.

ALBANY, N. Y., Aug. 31 1874.

A few days' visit to this city, most of which has been spent in the examination of its industries, has given your Philadelphia correspondent numerous items of interest for your readers in the trade. To those who are at all interested in forecasting the certain development of our principal industries, Albany forms an especial noteworthy point. Notwithstanding the fact that the city is located at a distance from both coal and ores, there are certain points of advantage in location and facilities for communication which attract capital here to the iron industry. A brief examination of these advantages shows that the capitalists who have ventured their money on furnaces at this point on the Hudson counted wisely for the future, and that their example will be followed for years to come by others desirous of obtaining desirable and profitable locations. Already four blast furnaces are erected here, and if wisely managed cannot fail to be successful. To enumerate the reasons why this locality strikes the stranger conversant with the requisites for furnace sites and general iron making as especially favorable, is an easy task. First, therefore, of these is convenient space, and in this is included the whole area bounded by the island upon which are now located the furnaces of the Oleote Iron Company and of the Jagger Iron Company, formerly Corning Iron Company. Here is a tract of land, and water capable of being filled in for made land, of several thousand acres, and directly bordering the Hudson River on the one side, with deep water for ore receipts and iron shipments, and at the rear connected with the tracks of the Albany & Susquehanna Railroad, leading directly to the Scranton and Luzerne anthracite coal fields of Pennsylvania. Abundant space is thus given for at least one hundred blast furnaces in the future, with a constantly improving ground resulting from the deposit of slag, and a growing market for product all around, united to distant markets by natural waterways. The second point to be considered in discussing the advantages of this locality for blast furnace erection are the facilities for securing supplies of ore and coal and of shipping product. These would seem to be as follows: From the north, the magnetic ores of Lake Champlain and the fossil ores of St. Lawrence county, as also in the future the enormous deposits of the Adirondack region, are within easy water communication, and under favorable circumstances can be put here for $5 per ton, costing actually for magnetics, when ores were high, $7·50 per ton. From the South come the hematites of Duchess county and the spathic ores of Columbia county, neither very rich in iron, but notably free from impurities, and highly suitable for admixtures with the harder magnetites. Both the magnetic and hematite ores mentioned are brought here by water, and with the improvement of the upper Hudson and lake navigation will come at greatly reduced freights. Hence the question of ore supplies would appear to be well settled in favor of this site, while among them, as is well known, are ores such as the Fort Ann, Fort Montgomery and Columbia county ores, which are true Bessemer ores, capable of producing a pig metal equally suitable for conversion with the West Cumberland pig, of England. As to the fuel question, the supply may be brought from various sources. The Albany and Susquehanna Railroad, the Delaware and Hudson Railroad and the Delaware, Lackawanna and Western give a connection with the coal fields of Central Pennsylvania. At Newburgh the Erie branch furnishes another connection with the bituminous coal fields for rolling mill uses, and the Hudson River opens the way to the anthracite coal yields of the Schuylkill Valley. Coals, under these circumstances, ought to be put here for $4 per ton. Limestone is never scarce in our country. The only remaining point to be considered is that of market for product. This would seem to be, to a great extent, at hand. Albany is, and has been for years, in connection with Troy, a noted stove making center. The Oriental and American Works, of Messrs. Perry & Co., here alone consumes some 6000 tons of pig metal annually; other works are nearly up to this mark, so that without figures to quote it is probable that this branch of industry alone would require the product of a number of furnaces. At Troy are the Bessemer Works, of Messrs. John A. Griswold & Co., with a demand for nearly 30,000 tons pig metal annually for conversion, as well as large iron works engaged in rolling various kinds of iron, axe works, tool works, hoes, cultivators, car works, and an unlimited iron industry. For Eastern transportation the Boston and Albany Railroad connects the Hub by a line of two hundred miles, and to the South, and with the "rest of mankind," the Hudson furnishes a free and uninterrupted highway for nine months in the year. Under all these conditions Albany strikes an inquisitive stranger as a particularly desirable place for iron making. The local gossip is little. One of the Jagger Iron Co.'s stacks has just been blown out, and the other is working badly, owing to difficulties with the hot blast, which is all the more discouraging since orders are coming in for iron, and under the present furnace manager, Mr. Davis, the iron produced was of a specially good quality. The Oleote Iron Co. has one stack in blast and is making iron freely. The engines at these furnaces are fine specimens of work from the West Point Foundry. The Albany Iron Works, of Corning & Co., about here, are, and have been, steadily running. At these works, I am informed, angles 61 feet in length were lately rolled. This firm is about introducing to the trade a new and, it is said, improved horse shoe, made by a special machine at the rate of 45 complete shoes per minute. This ought to create quite a revolution in machine made shoes, and as the invention is in the hands of a firm of unlimited capital it will doubtless be a success.

Few inland cities of the East offer more advantages for manufacturers than Albany, and that it will be a great iron producing site in time is clearly apparent.

Early History of Iron Making in Ohio.

It has been generally accepted as a fact that the old Bush Creek furnace, in Adams county, built in 1811, was the first stack erected in Ohio. This is now called in question. The Youngstown *Tribune* says: "We have been making some investigations in regard to the early iron works in Ohio, and we believe that the first blast furnace in the State was in Mahoning county. In 1803, a small charcoal furnace was erected on the Yellow Creek, about one mile from its mouth, in Poland township, in this county, now Mahoning, then Trumbull.

The pioneer iron master was Daniel Heaton, who alone and unaided erected this monument to his memory, simultaneous with the admission of Ohio into the Union.

The furnace, like all other furnaces built in early times, was a small affair, and only produced from two to three tons per day, which was principally cast in the form of pots and kettles and small hardware.

The concern was not a financial success, and was only run about three years. The land upon which the furnace was built had a cloud upon the title, and the matter got into the courts, a man named Lodwick Ripple claiming ownership. Ripple and Heaton fought in the courts until in 1813, when Heaton came off victorious.

Heaton was represented by old settlers who knew him to have been eccentric. He was chosen to the legislature for a single term; the precise date we have been unable to ascertain. During his term of office he introduced a bill to have his name changed to Dan Eaton, alleging that Daniel Heaton was too long. His prayer was granted, and he was ever after known as Dan Eaton.

The Eaton family seemed to have possessed a mania for building furnaces. In 1806, James Heaton built a stack on the Mosquito Creek, in the village of Niles, located where the splendid Union school building stands. This furnace was in operation, off and on, up to the year 1854. John R. Grist, of Lowell, at one time, owned an interest, and left behind him, we believe, a portion of his California '49 accumulation.

James Robinson and John Battles were the owners at the time of its abandonment, having lost two or three farms in the operation. But to return to the Yellow Creek.

In 1806, David Montgomery, father of our worthy citizen, Hon. R. Montgomery, built a second stack on the Yellow Creek, about one-half mile from its mouth. In 1808, he associated with him Robert Alexander, David Clendennin and Capt. John Struthers, and, under the firm name of Montgomery, Clendennin & Co., operated the furnace, with fortune, up to 1812, at which time every able bodied man about the place was drafted, and marched to the frontier, starting from Youngstown, August 6th, 1812. The furnace was never started up again.

Capt. John Struthers was the father of Hon. Thomas Struthers, well known in this community, and also of John Struthers, Jr., an aged veteran, now residing on the old homestead at Struther's Station.

The money to build the establishment was furnished by David Montgomery and Capt. John Struthers, who put in as his share a farm containing ore and timber. The enterprise was not very profitable, and was abandoned, as above stated.

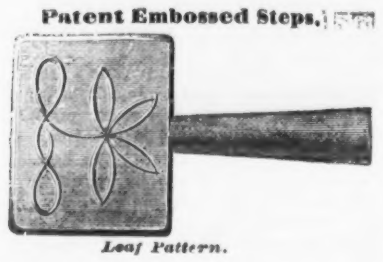
A pleasing sequel to the primitive furnace is the present Struthers furnace. In 1868, Hon. Thomas Struthers, of Warren, Pa., sought for the farm sunk by his father, nearly sixty years previous, and purchased the same. He associated with him John Stambaugh, Thomas W. Kennedy and John Stewart, and furnished the capital to build one of the finest furnaces in the country. The stack is located not far from where the old charcoal furnace stood, and has been very successful—the yield of iron making as high as sixty tons per diem, or as much iron in one hour as the old furnace made in twenty-four.

We have given this matter careful investigation, and have the records to show that the first blast furnace erected in Ohio was in 1803, as hereinbefore stated. The builder has long since gone to his reward, and, let us hope, to that portion of the eternal realm where furnaces are unknown.

Many years ago two or three Russian gentlemen visited some American machine shops and factories and conversed with the owners and employes. The result was the construction of the great Moscow Railroad by American contractors, and consequent upon that, the adoption of numerous American systems, and afterward the clearing of Sebastopol bay by an American company. There is now another Russian delegation wandering quietly through our mills, factories and furnaces. One of the members recently visited Paterson to inspect the locomotives that are being built there for the Russian government. He remarked that "American iron workmanship is superior to European in every respect except the rolling of steel plates." The opinion is disinterested, and therefore more valuable. It is complimentary in the highest degree, and its sufficiency is probable, because a government would hardly delegate an incompetent judge for such a duty. The favorable character of the opinion is well calculated to send new and greater business hither, not of this nature only, but in every branch of fabrication—to open a market to American manufactures that has long been enjoyed by England and Germany.—*North American.*

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.

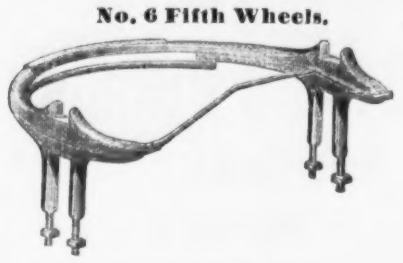


Leaf Pattern.

Established 1850.

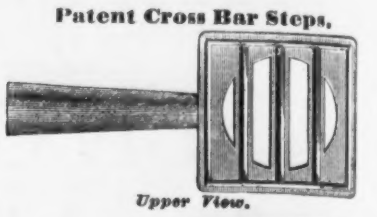
King Bolt Yokes.

No. 6 Fifth Wheels.



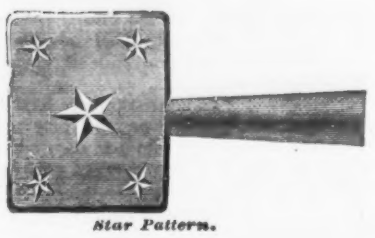
1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.



Upper View.

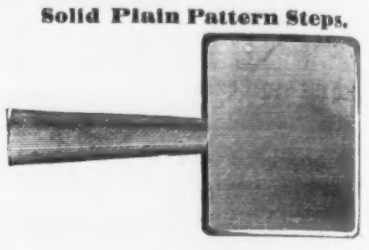
Lower View.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.

Solid Plain Pattern Steps.



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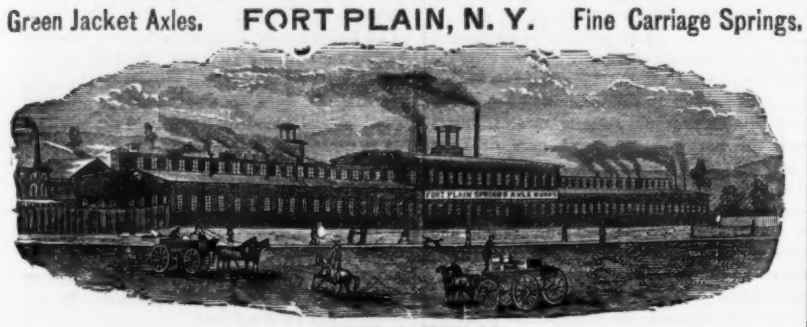

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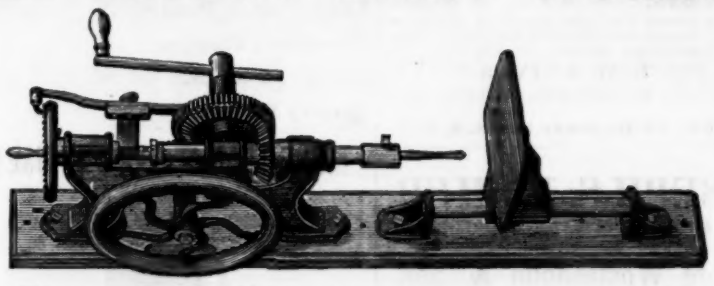

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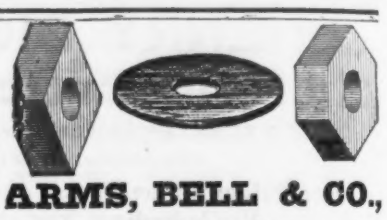

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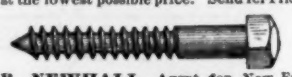

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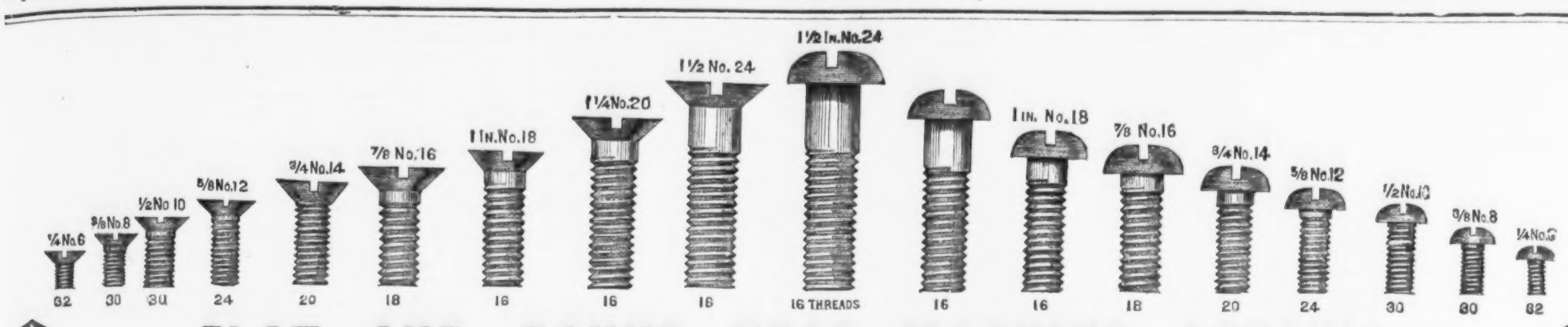

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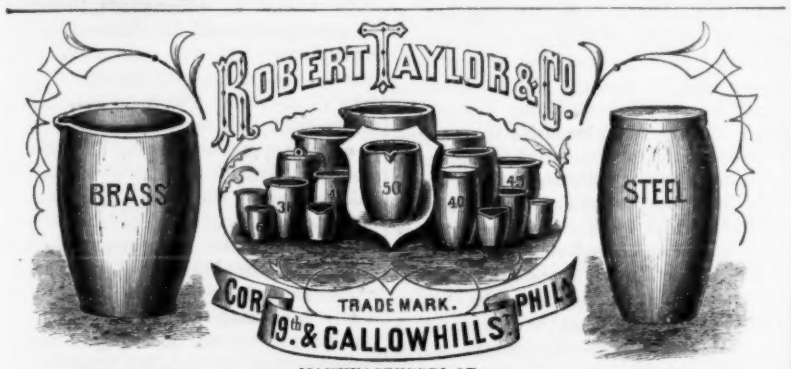

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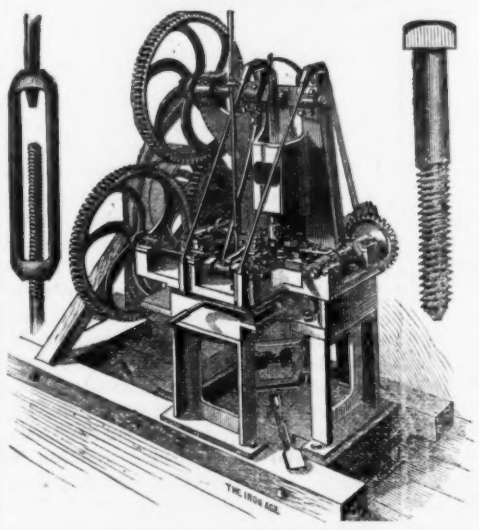

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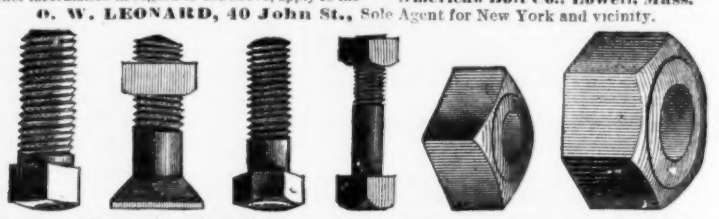

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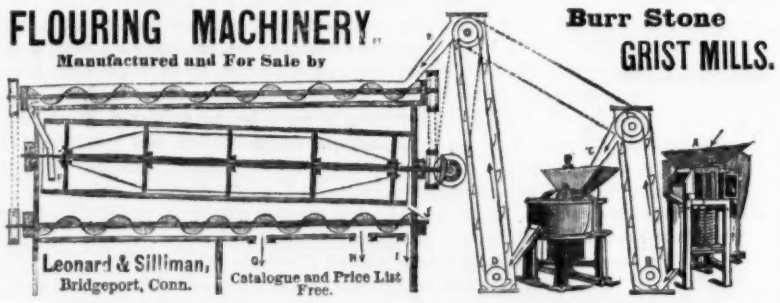

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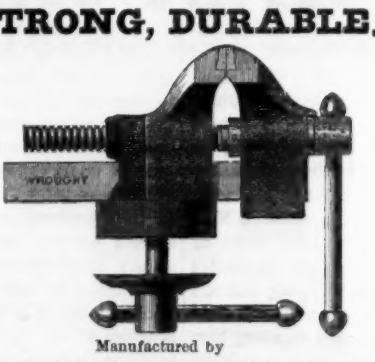

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An English View of Reciprocity between the United States and Canada.

It is not difficult for those who have given the subject the attention it merits, to discern the nature of the forces operating to promote reciprocity between this country and Canada, nor to see what ultimate results are sought thereby. The Sheffield *Telegraph* of Aug. 22d discusses the question editorially at considerable length, and shows by argument and inference how deep an interest the British manufacturers have in starting the wedge which, it is believed, will open the way for free trade with this country. Referring to the recent protest of the manufacturers of Pennsylvania against reciprocity, the *Telegraph* says:

What wonder these gentlemen indulged in heated speeches and passed condemnatory resolutions? They know that the Reciprocity Treaty once passed the days of monopoly are numbered. Congressional and especially Senatorial mills grind slowly, but, with the new Democratic blood being rapidly introduced into their management, they will inevitably grind monopoly to an impalpable powder. Meantime, in the wrath of Pennsylvanian manufacturers at the probable introduction of what they consider to be the thin end of the wedge, known as reciprocity with Canada, the thick end of which is Free Trade, English manufacturers in general, and Sheffield manufacturers in particular, should see that something is transpiring worthy of their earnest attention. Since Pittsburgh is so enraged at the distant prospect, when import duties are abolished, of being brought into a neck and neck race with Sheffield—Sheffield only handicapped with the cost of freight across the Atlantic, it is time for Sheffield to get itself into training, that when the event comes off it may not be found too late at the tape. The event is yet in the distance, but what we desire to point out to Sheffield manufacturers is this—as the winners of the Two Thousand Guineas, the Oaks, and the Derby give some indication of the winner of the Great St. Leger, there may be a field in which Sheffield manufacturers can, in the event of the Reciprocity Treaty being ratified, show their capacity for competing with Pennsylvanian manufacturers on their own ground, when free trade, of which Reciprocity is the first fruits, opens that ground to international competition. England has been emphatically assured by the Canadian Prime Minister, the Canadian Plenipotentiary, and—lastly and most strongly—by Lord Dufferin, in his speech at Chicago, that Canada will not consent to a differential arrangement to the prejudice of the mother country. *In other words, what the United States is permitted to import into Canada at specific duty or free of duty, that also it will be arranged may be imported from the United Kingdom on precisely the same terms. Well, then, shall not our iron and hardware manufacturers go up and possess the land?* The import duties into Canada of the articles named are as follows:

	Per cent.
Canada plates and tin plates	5
Sheet iron	5
Nail and spike rod iron	5
Bar, rod, or hoop iron	5
Boiler plate iron	5
Rolled plate iron	5
Brass or copper manufactured	15
Hardware	15
Plated wate	15

Now free admission of all, or nearly all, these articles into Canada will no doubt be stipulated for on behalf of the American manufacturers of them. If such a stipulation is ratified, the same privilage will be conferred on English manufacturers. Surely they will not fail to take advantage of it when the disadvantages they will labor under will be merely the difference in freight, which will always exist in consequence of two thousand miles of ocean rolling between the countries—a difference which very slight economy on this side of the water would easily surmount. Shoals of American citizens are passing over to Canada in the summer season; and as we, when in a Continental country, buy our box of cigars or other cheap product of that country, so American citizens in Canada ramsack the various cities and towns for cheap purchases; articles of British manufacture being specially in demand. Our serious advice to our manufacturers is: Leave no stone unturned to take the leading position in the Canadian markets when the Reciprocity Treaty is ratified. Send to the new Dominion the best specimens of your manufacture, and charge the lowest practicable price, because in so doing you will be hastening the downfall of American monopoly, and, by your excellent workmanship and reasonable charges in the smaller market of Canada, throwing open for yourselves the larger and almost unlimited market of the American Union, and obtaining a foothold there from which, if you act with sustained energy and discretion, you can never be driven.

This tells the whole story. When American manufacturers meet to protest against reciprocity on the ground that it strikes at a vital part of the system of protection to home industry which has promoted—if, indeed, it has not alone rendered possible—the rapid and sustained development of our productive industries during the past twelve years, they are accused of seeking to perpetuate a monopoly which is "sucking the life blood of the nation." When the friends of reciprocity speak, they can say nothing to the point without admitting that the efforts of American manufacturers to avert the threatened calamity are inspired by the unerring instinct of self-preservation.

The argument of the Sheffield *Telegraph* is good. Instead of deriving any benefit from reciprocity in the way of securing a larger market for our manufactures across the line, we should find ourselves exposed to a sharper competition than now exists. The Canadian government would extend us no privileges which are not shared by the manufacturers of the mother country, and with the additional stimulus thus given to trade with England, we should be driven from the Canadian markets. As it is now, we manufacture a very large part of the hardware and metal goods imported for the Canadian markets. Notwithstanding the rates of duty given above, we have built up an important trade with the Dominion in manufactures of iron, especially in shelf hardware. During the past two years we have been able to underbid the English agents by from 10 to 25 per cent. The difference is not so great at this time owing to the decline in coal and wages in England, but the American styles and patterns remain more popular where they have been introduced and more generally saleable, especially where no prejudice exists for the English and against American manufactures. Among the classes of articles of American make now well established in popular favor in Canada may be mentioned saddlery hardware, bronze hardware and imitation bronze goods of all descriptions, cheap table and pocket cutlery, house furnishing goods, silver and nickel plated wares, scissors and shears, and shelf hardware in general. Facility of transportation by rail is one advantage which has helped our manufacturers in competing for Canadian trade. We know of one instance in which a large hardware dealer of Hamilton, Ontario, came to New York and bought several large bills of goods. Having completed his purchases he returned home by rail, stopping but one day on the road, and when he reached Hamilton he found the goods awaiting him there. The same goods could not have been obtained from England under six weeks or two months. With these advantages we can hold our own in our competition with Great Britain in the Canadian markets. Reciprocity would not help us, for the reasons set forth by the Sheffield *Telegraph*, but it would have precisely the opposite effect. The British manufacturers would be encouraged to send large quantities of goods to Canada *for the United States market*. Throw open our lake ports and border towns to so-called Canadian manufactures, and we should be flooded with cheap manufactures from Great Britain. Still worse—for smuggling could be stopped only by maintaining a costly detective system, which would bring the government no revenue—British manufacturers depending upon the American market would transfer their skilled labor to Canada, where, with the aid of improved American machinery, they could manufacture for this market under conditions with which we could not compete. We should thus build up Canadian manufactures at the expense of our own industries; and however alluring the prospect of cheap goods may now seem to those who cannot reason beyond the simple proposition that it is desirable to buy what you need to-day as cheap as possible, without regard to to-morrow, millions would curse the day that such a treaty as that now awaiting the consideration of the Senate was ever ratified. No friend of American industry needs a better argument against reciprocity with Canada than that presented in its support by the Sheffield *Telegraph*, which should be copied into every American paper.

Material Independence.

The attainment of material independence has been the aim and object of all worthy and well directed national effort since the organization of society. This attained, those nations capable of reaching a certain degree of civilization have enjoyed, as the rule, the benefits of regular and sustained progress, which has enabled them to supply many of the wants of less civilized nations, while receiving from them, in exchange, means of enjoyment which could not be obtained within their own limits. National greatness built upon territorial conquest, and national wealth coined from the spoils of war, have never possessed any of the elements of perpetuity. The civilization of China and Japan, irregular in its development but resting upon a basis of deversified industry which rendered absolute material independence possible for centuries, has outlasted the more brilliant but less substantial cizilization of Rome and the Byzantine Empire. So long as the latter followed the example of the former and strove to develop their highest capacity for self-sustenance, so long their existence as nations was assured, and whatever they achieved of real greatness was conceived and carried out during this period of concentrated nationality.

Happily for this nation, its territority is so located as to insure it the advantage of a climate favorable to the highest mental and physical development among our people, and to the prosecution of every industry essential to man's well being and happiness. In extent and variety of productions the country is very nearly self-sustaining already, and if cut off from communication with the outside world, we have within our own boundaries the means of maintaining a true material independence. We might miss this thing or that for a time, but the unsatisfied desire would be the best stimulus to greater effort in providing substitutes for that of which we were deprived. There is, of course, no probability that such a misfortune as national isolation will ever overtake us, though wars may multiply and the world be in league against us; but the consciousness of our ability to maintain, if need be, an existence of absolute material independence, is a proud one for every American citizen, and true national greatness has its germ in this sentiment.

But great as has been our national progress in the development of our vast and varied resources, it has not been as rapid as it would have been if more of our young men had appreciated the opportunities open to them of reaping wealth and influence by thoroughly learning and intelligently practicing the mechanical trades, which offer so many inducements, especially to those who can command capital early in life. There never was in this country, and probably never will be, a time when intelligent and well educated mechanics are not in demand. Commerce and the learned professions are overcrowded, but the mechanical trades are always open to young men of energy, enterprise, skill and technical knowledge. A man who has a trade is independent. If merely a skillful artisan he can almost always command steady employment at better wages than are earned by the average of clerks and bookkeepers; if a master of the theory and practice of his trade, and fitted for a higher position than that of journeyman, there is nothing in the way of his attaining any position of responsibility, profit and honor in his trade to which he may aspire. Capital is always seeking such talent, and when it finds it it clings to it with hooks of steel. Wealth, honors, social position and public influence are all within the reach of the well educated and ambitious mechanic, and no man is less dependent upon the favor of others, even in early life. To the young man who has opportunity for a course of study in one of our technical schools, and who is willing to spend a year or two in the practice of the trade he may choose, supplementing his work by special study and reading, the road to success is easy; to those who cannot lose the time and incur the expense of acquiring a technical education, it is longer but no less certain if followed intelligently. We present these facts for the consideration of fathers with sons growing up to manhood, and of young men out of employment who are looking for clerkships in branches of business already overcrowded. The greatness of this country depends upon the extent and variety of our productive industries. Our future power, wealth and influence will be achieved not by our soldiers, our statesmen or our political economists, but by our mechanics, and certainly no field is so inviting in this age of progress as that offered by the mechanical trades.

The Centennial.

In a special advertisement addressed to the manufacturers of the United States, which will be found in another column, the Centennial Commissioners announce their readiness to receive applications for space in the International Exhibition of 1876, at Philadelphia. It is important that they should know with the least possible delay what space will be required in each of the departments of the Exhibition by American exhibitors, in order that it may be determined what room can be assigned to foreign nations. Manufacturers and others who purpose exhibiting should, therefore, make known their intention promptly, and thus avoid the disappointment of finding the room they desire pre-occupied be foreign exhibitors. It is especially desirable that early provision should be made for the organization of those collective exhibitions of the natural resources and raw materials of different sections of the country which cannot be made by individual exhibitors. The importance of this, as an incentive to immigration and to the investment of foreign capital, cannot be over-estimated; and a liberal provision for the prompt and thorough performance of the work will amply repay those States which undertake it.

We wish to impress it upon the minds of our readers that the success of the Centennial depends solely upon the interest which the manufacturers of this country take in it. Hitherto they have neither manifested nor felt much concern in the matter; and had the project been abandoned upon the refusal of Congress to aid it with an appropriation, we doubt if any large proportion of the manufacturers of the United States would have regretted the decision. This is not creditable to our enterprise, and it does not argue much for our patriotism, considering that the faith of the nation has been pledged to the undertaking, and that its failure would have been—and would still be—a national disgrace. We have no doubt that, as the time fixed for the opening draws near, a great deal more interest will be felt in the exhibition than is felt at this time, and that many of those who are now apparently indifferent to the success or the failure of the enterprise, will be among the most eager to reap all possible advantage from it. It is an opportunity which those who have anything to exhibit worth showing cannot afford to neglect, and it is the part of wisdom to make timely preparation. Blank applications for space, with directions and other useful information, may be obtained by address ing Mr. A. T. Goshorn, Director General, U. S. Centennial Commission, Philadelphia.

The *Engineering and Mining Journal* invites *The Iron Age* to a controversy which, on the basis it proposes, would be interminable, without being either interesting or edifying. A few weeks ago we published an article containing some interesting facts about the cost of iron making in Virginia. Our neighbor called them gross exaggerations and accused us of having accredited Prof. Anstead with statements he never made. We are averse to newspaper discussion, but in this instance so far departed from our usual rule as to cite ample and acceptable authority for every statement we made, including Prof. Anstead himself, from whose testimony before the Senate Transportation Committee we quoted verbatim. Our neighbor, in its sad, sweet way, resumes its attack. This time it questions the veracity of our authorities, accuses us of garbling extracts which we printed word for word without addition or omissions—including the words we are accused of having omitted, which were printed in italics. To this it adds a great deal of personal abuse, which we hope its readers will enjoy. Henceforth it may have its little quarrel all to itself.

The Trade in Tinned Goods.

During the seven months ended July 31, 1874, the imports of tin plates into the United States from Great Britain amounted to 53,405 tons, as against 58,462 tons during the same period last year—a decrease of 5057 tons. This indicates a very material reduction in the demand for the manufactures of this article, and must be attributed to the same causes which have operated, since last September, in all branches of business, to check production and compel the manufacturers to keep their stocks of goods down to the actual demands of the market.

Building operations were seriously affected by the panic of last year, and have not yet recovered from its effects; consequently, the demand for roofing plates has been less than usual. A large percentage of the decrease in importations may be accounted for by this fact. It is estimated by some of the largest manufacturers of stamped tin ware in this locality, that the quantity of goods actually turned out of the various workshops during this year up to date is nearly equal to that of 1873, while the stocks in the hands of dealers are smaller and in better order than they were at the opening of last years' fall business.

The market is dull at present, and although some signs of activity are beginning to manifest themselves, the season is hardly far enough advanced, as yet, to enable a correct judgment to be formed as to the course of trade. The manufacturers are hopeful, but last year's experience has made them cautious, and they are not accumulating stocks. Still there is a certain confidence manifested by the trade that the fall business will be a good one. The products of the workers in tin plate are so necessary to many of our industries, and of such essential importance in our household economies, that in almost any state of the market for other goods, there must be a certain demand for them—a demand which must grow with the growth of population, and can only be checked temporarily in any case. The trade is, of course, influenced by the same causes that operate in causing oppression in other lines of business, and will sympathize with the prevailing tone of the market; but it is less liable to be influenced by sudden changes in the general course of commercial affairs than many other branches of manufacture.

The many improvements that have recently been made in the machinery used for making tinned goods by American manufacturers has been the means of enabling them to add a considerable export trade to the demand for home consumption, and there is reason to believe that this foreign trade will steadily increase, especially with the near-by markets of Central and South America and the West Indies.

Certain important principles in patent law have been laid down in the decision of Judge Nixon in the U. S. Circuit Court, District of New Jersey, in the case of Crouch vs. Speer and others. The court holds as follows:

1. In order to render a device patentable, it need not possess greater utility or be better than others of its kind: it is sufficient if, being new, it serves a useful purpose.
2. A patent raises the presumption that the grantee is the first inventor of the article monopolized; and to overcome this it must be shown that there was prior knowledge of the invention, under such circumstances as to give the public a right to continue the use of it.
3. If a reasonable doubt exists as to the truth of the evidence adduced to impeach the novelty of the invention, the presumption in favor of the patentee must prevail over it.

New Publications.

THE TRAVELERS' OFFICIAL GUIDE. National Railway Publishing Co., Philadelphia.

The September number of this valuable publication is promptly at hand. It contains the usual amount of valuable information in the shape of official lists of the officers in charge of the various departments of the several railroads, the time of sailings of ocean steamers, &c., &c. The latest changes in running time of the roads is announced, and the tables published in detail. The through time tables, a specialty of the Guide, are very full and complete. The *Gazetteer of Railway Stations*, recently published by the same company, is very complete in itself; but the constant changes in the items of information which it gives, on account of the rapid development of the country, makes the publication of the new page in the Official Guide devoted to a Supplement to the *Gazetteer of Railway Stations* of special value.

At the last session of Congress an appropriation was made for erecting new lighthouses along the Delaware River. At Bulkhead Shoals, between Newcastle and Fort Delaware, range lights will be placed. Two lights will be located about one mile above Fort Delaware, and two will be placed two miles below Newcastle. A new lighthouse will also be erected on Ship John Shoal, about three miles south of Cohansey light, and a structure at Cross Ledge, to replace the lightships. General Reynolds recommended, in addition to these, the erection of lights at Cheney Island flats, Marcus Hook bar and the lower end of Little Tinicum, but no action has as yet been taken upon the suggestion.

Practical Ironwork.

BY GRAHAM SMITH.

In offering the following remarks on practical ironwork no time will be wasted by prefatory detail. It will simply be assumed that the skeleton of an iron structure has been decided upon, and the strains ascertained to which each of its members are to be subjected, and the purpose of this paper will be to investigate the practical considerations affecting its design, strength and construction.

No attempt will, therefore, be made to delineate the process by which these strains have been arrived at, as that portion of the subject can only be mastered by deep and patient study of existing structures and standard works on the subject.

In apportioning the proper amount of metal to meet the strain, the first care should be to employ as nearly as possible only iron of the economical sections, weights, and lengths to be obtained in the iron market—points not unfrequently overlooked. For instance, L irons 4 in. by 4 in. by ⅛ in. can be obtained in lengths of 30 ft. without extra cost, and they are sometimes rolled at an additional cost to 40 ft. in length. At the Vienna Exhibition a Z section of rolled iron was exhibited 85 ft. in length. Ls, Ts, and similar sections can be obtained in moderate lengths without extra charge when the sum of the sides does not exceed 8 in. or 9 in.; with larger sections, such as H iron, having a depth of about 12 in., the cost will be something over 20 per cent. more than that for T or L irons complying with the above conditions. In the same way an extra price is generally paid for bars exceeding 6 in., although up to 8 in. or 9 in. it is not excessive, and they can be obtained from some manufacturers up to 12 in. in width.

It is in dealing with plates that the term "extra" must always be kept in view, as by bad designing the cost of the iron may be nearly doubled; a plate to cost the ordinary market price must be under 4 cwt. in weight, 15 ft. in length, 4 ft. in width, and must not be of irregular shape. In order to better illustrate this point a plate 15 ft. by 5 ft. 1 in. by ⅝ in. may be taken as an example, and the extra charges, according to formal tender made in 1873 by a first-class firm for "Best best crown boiler plates," will be:

	£	s.	
For weight	12	0	per ton.
" length	0	0	"
" width	3	10	"
" cutting	0	0	"
In all	15	10	"

The price for iron by this tender complying with the previously mentioned conditions was £19. 10/, to which this extra charge must be added, bringing it up to £35 per ton, or nearly double the cost of ordinary plates.

These considerations must be attended to in designing buckled, corrugated, or other manufactured forms of plates, as if they require to be made from iron on which "extras" are charged, their cost will necessarily be enhanced.

At the Vienna Exhibition plates were exhibited 52 ft. 6 in. by 5 ft. 3 in. by ·63 in. and 48 ft. 7 in. by 4 ft. 2 in. by 1·23 in. weighing 3 and 4½ tons respectively. These were of course exceptional and very costly plates.

The "extras" for plates do not become very considerable until a weight of 7 cwt. is exceeded and a width of 4 ft. 6 in., but when a width of 5 ft. is reached the extra is charged per inch, and by the tender, before referred to, it amounts to 10/ per inch per ton in addition to £3 charged extra for a width of 5 ft.

A long plate becomes expensive on account of the difficulty in handling it, and the great care required to be exercised in putting it through the rolls, in order to avoid making it of irregular shape, in which case there is a large amount of waste in cutting the plate to the required length and area, and sometimes it becomes what is technically termed a "waster," which has to be thrown aside; to cover these contingencies, much larger "blooms" have to be made.

Contractors have sometimes to tender for iron work when the designs contain many of these irregular lengths and dimensions; it then becomes necessary for them to estimate the probability of the conditions of the design being enforced, not always an easy matter; but when the reason for the employment of extra iron is obvious they tender accordingly. Occasionally designs exhibiting a total ignorance of iron work come into the contractor's hands, in which case estimating becomes very difficult, and to be on the safe side a large percentage must be put on to cover contingencies.

The contractor can generally estimate the quality of the work which will suffice by the workmanlike style or otherwise in which the drawings and specifications are made out.

Angle iron bends and joggles should be as few and simple as possible, and bent or cut plates should be few and far between.

T-stiffeners to the web of a plate girder, if splayed out clear of the angle iron, will cost about half as much for smithing as when required to fit close round them, and will answer their purpose equally well; where the flanges are too narrow to admit of four rows of rivets being put through at one cross section, this form of stiffener cannot be used; where the flange requires only two rows of rivets, but is of sufficient width to admit of two additional rivets, the stiffeners can be generally so arranged that these rivets shall in no way affect the strength of the girder, as owing to the unvarying thickness of plates there is always an excess of strength in the flanges of a plate girder at points not very far distant, and it is here that the stiffeners should be placed.

The harrassing little, but still most important rivets, should be carefully considered, as it is on them that the whole strength of the structure depends—no amount of extra metal in the body of a tie can compensate for a badly constructed joint. The author would advise careful consideration of the position, diameter and pitch of every rivet previous to placing the design before contractors, as carelessness or ignorance on this point at once indicates the amateur designer, who is often led astray by the facility with which he can ornament his drawings with these little circles or red crosses.

Drawings of ironwork should be as complete as it is possible to make them, free from all ambiguity, leaving no room for doubt as to what is intended; in order to effect which dotted lines must largely be employed. It is impossible to confuse a drawing by putting dotted lines in their proper places, as it must be borne in mind that the drawings are not to be submitted to a parliamentary committee, but to men accustomed to most complicated mechanical drawings. A working drawing is not necessarily pretty, it should be neatly and accurately made, and should require no explanation whatever.

The pitch and diameter of the rivets should in all cases be marked upon the drawings, and their relative positions in the structure should be pointed out. In the construction of a bridge it is generally necessary to draw the whole or parts of it full sized with its required curve or camber, in order to ascertain the accurate length of its separate portions and the exact relative positions of the rivets, which will, by this means, be very accurately ascertained; these positions will then be marked on a template, from which any number of similar plates can be made.

It is usual to specify that when one portion of a structure is to be riveted to another, the holes must be made with such accuracy that a template with studs fixed in the relative position of the rivets, one-sixteenth less than them in diameter, shall enter all the holes at the same time and go completely through the various thicknesses of plates; if the holes are not fair to one another, the shearing area of the rivet is reduced, and therefore the joint will not be of its calculated strength, to cover which fault it is advisable in calculating the number of rivets to consider their diameter, one-sixteenth less than that shown on the drawings; all rivets should have a good and sufficient head, and when inspecting the construction of ironwork this point should be enforced.

The strength of rivet iron will be considered hereafter, but a good practical test is that a rivet shall be hammered when hot, to less than ½ in. in thickness without showing any signs of cracking.

Although a difference of opinion exists among engineers on the question of drilled *versus* punched holes, it would appear from the following experiments carried out by Mr. Cochrane and kept on record in the Minutes, vol. xxx., that practically there is little to be gained, so far as the strength of the plates is concerned, by using one method more than the other.

A bar of Lowmoor 2 in. x ½ in. with a drilled hole ⅜ in. in diameter put through it, sustained 235 cwt., and with a punched hole 226 cwt.; with bars of hard crystalline iron of the same dimensions, that with the drilled hole sustained 250 cwt. and the punched hole 244 cwt. With bars each with three holes, one drilled, one punched, and one punched ¾ in. and drilled to ⅜ in. in diameter, in all cases they broke through the punched hole, which would be inferred from the above results, but which are still well within the limits of variation of the breaking weights of our best irons.

When we leave strength out of the question and consider only workmanship, the method to be adopted must be left to the judgment of the engineer. If a number of plates are to be riveted together, or an intricate junction made, unless great care is exercised by a very experienced hand at a punching machine, the drilled holes will be more accurate, but where a simple plate and L iron are to be joined together the balance of strength in favor of drilling is not sufficient, in the author's opinion, to sanction the extra cost.

A want of proper welding in the lamina of iron may be sometimes detected when punching; it is difficult to punch near the edge of bad iron, but a drill may be put through almost any rubbish.

The cost of cast iron may be also greatly enhanced by bad designing, but as civil engineers have not often to deal with very intricate forms it may be sufficient to say that the molten metal is run into molds, and that, with the exception of very large castings which are built up bodily, these molds are formed by placing in the sand a pattern in wood of the object to be cast. Of course this is well known to all, but still not always remembered, if we may judge from the number of boxes and cores sometimes required for what ought to be simple castings.

In a casting such as a transverse truss of an arch bridge, the different portions of the truss should have nearly the same amount of cross section, as if this is not attended to the members with the smaller body of metal will cool first, and the remaining portions in cooling will put an initial strain on the iron which may distort or even cause its destruction; for these reasons every precaution should be taken to insure that the casting may cool evenly.

As regards the quality of cast iron, for want of space a few words must suffice. For structural purposes it should be melted at least twice, and mixtures should be made which will stand the following test: A bar 3 ft. 6 in. by 2 in. by 1 in. run each day from the cupola from which the castings are being made, should, when placed edgeways on 3 ft. bearings, sustain a load applied at the center of 28 to 30 cwt., and give before breaking a deflection of five-sixteenths.

The cast iron of the sleepers for the Great Indian Peninsula Railway had to undergo tests very similar to this, and, in addition, the sleepers had to stand a weight of 3¾ cwt. falling a hight of 5 ft. 6 in., the same having previously been subjected to blows from this weight falling 2 ft., 2 ft. 6 in., 3 ft., etc., up to 5 ft. 6 in., being at the time of testing on sand not more than 24 in. deep; the average hight required to break the sleepers was 7 ft. 9 in. The cast iron was also to stand a tensile strain of 11½ tons per square inch, and the average was 13·07 tons, a very high but obtainable result. It is not advisable to restrict the manufacturer by stating the proportions and classes of iron to be mixed, as he will in most cases be better able to judge of the mixtures to be made in order to produce a specified result. Not that the author would advocate leaving too much to the practical man, as we not unfrequently come across the "miscalled practical man," who will tell you that he is able to judge of iron by its appearance, a statement which must be accepted with caution, as men who have given much more time than most engineers can devote to the study of iron, very often err in their conclusions formed only by inspection. An instance came under the author's notice where a fracture of rod iron was shown and pronounced first-class, and on the other end of this rod, not 6 in. in length, being exhibited it was pronounced little better than trash; in the first instance, the fracture was of a fine silky, fibrous nature, which denotes that the iron is soft, tenacious, and generally of good quality, whilst in the latter case it presented a rather coarse crystalline fracture, which, owing to the largeness of the crystals, showed that the iron was not quite of a uniform quality, but the appearance was chiefly owing to the mode of testing, as if iron is broken by a sudden strain it invariably presents the crystalline fracture; whereas if good iron, and broken by a gradually increasing strain, the fibrous fracture always results; nevertheless, it is the generally accepted opinion that the fibrous fracture cannot be obtained by any mode of testing from really bad iron; the gradually increasing strain should therefore be applied, and the fibrous fracture must result from good iron, more especially from rolled iron or plates.

Whether the iron is fibrous or crystalline its quality may to some extent be judged by the fineness of its texture, and the irregularity of its fracture.

Ironmasters are, to some extent, averse to testing; the author was advised by one of these gentlemen of high standing to exhibit his knowledge of the subject by simply specifying "best merchantable iron," and if, after inspection, it was found not to be good it could then be tested, but after what has been said it is needless to further point out the impropriety of such a proceeding; it was also hinted that tests were instituted to exhibit the cleverness of engineers, instead of which they simply exposed ignorance, and no doubt there is often room for such remarks.

According to Mr. Edwin Clarke the permanent set of a bar 10 ft. long and 1 square inch in section was for 3 tons, strain 1-468,750, and at 10 tons 1-74,953 of its length. The stretch of iron up to 12 tons is to some extent uniform, and may be taken at 1-10,000 of its length for each ton, but beyond this strain it becomes irregular, which accounts for the ultimate deflection of a beam being almost beyond calculation.

In the early days of engineering it was a common practice to make things strong enough, on the erroneous supposition that a structure tested with something more than its working load would be quite safe. This may or may not be true according to whether the limit of elasticity of the iron is exceeded. If such be the case the ultimate destruction of the structure is only a question of time; under any circumstances the design of a structure on such an hypothesis is now quite inadmissible, owing to the increased cost of labor and materials, and the criticism to which a design is always subjected.

The limit of elasticity of iron is that point at which the same strain will produce an increasing permanent set. An example will perhaps more clearly express this important point. If a bar be tested with a load of 8 tons, and the permanent set not increased by any number of repeated applications of this load, 8 tons is said to be within the limit of elasticity of the iron; if, on the other hand, the permanent set increases ever so little, the limit of elasticity has been exceeded.

It would, therefore, be well to specify that iron shall not take an increasing set with 8 or 9 tons, but that with 11 or 12 tons it must show a decided permanent set over and above that obtained with the 8 tons. The latter condition is required in order to insure the first being complied with, as an unprincipled manufacturer might put a higher strain than 8 or 9 tons, and so take all the stretch out of the iron previous to its official testing, in which case any iron would comply with this condition. This point is, in the author's opinion, one of great importance, for supposing the working strain put upon the iron to be 5 tons to the inch, although this may in some cases be only one-fifth of the ultimate breaking strain, the factor of safety will only be 1·6 in place of 5, as might appear at first sight, that is assuming the limit of elasticity to be 8 tons.

The working strain to which iron is to be subjected is governed by the specified quality and tests to which it is to comply with. In moderately small structures, where the working load is comparatively great in comparison with the weight of the structure, it will be found in most cases more economical to employ an ordinary quality of iron with a small working strain, than to use an exceptionally good material; the working strain of the iron is also governed by the character of the load. In the case of a girder supporting the wall of a building a strain of 5½ tons might with safety be put upon good ordinary iron, but in a small railway bridge of about 20 ft. span, where the moving load is to a great extent indeterminable, it is not well to impose a greater strain than 4 or 4½ tons.

From the author's experience and a careful study of the many results obtained by such high authorities as Mr. Kirkaldy, he concludes that ordinary iron to be found in the market should comply with the following conditions:

Rod, bar, and rivet iron should sustain an ultimate tensile strain of 24 tons per square inch, elongate 15 per cent. before breaking, and be reduced in sectional area about 25 per cent. Angle iron, an ultimate tensile strain of 22 tons, elongate 9 per cent., and be reduced in sectional area about 15 per cent. Plates with the fibre an ultimate tensile strain of 20 tons, elongate 6 per cent., and be reduced in sectional area about 8 per cent.; and across the fibre 18 tons, elongate 3 per cent., and be reduced in sectional area about 5 per cent.

	Tons per square inch.	Elongation per cent.	Contraction of area per cent.
Rod, bar and rivet iron	24	15	25
Angle iron	22	9	15
Plates with fibre	20	6	8
Plates across fibre	18	3	5

These requirements are not at all excessive, and should, therefore, not enhance the price of ordinary Staffordshire beyond the insignficant sum for testing purposes. The samples on which these investigations are to be carried out ought to be from 8 in. to 10 in. in length between the points of attachment. The toughness and ductility of the iron can be estimated, either from the contraction of area or elongation; it is necessary, therefore, to investigate both of these points, the choice between them being decided by the facility with which they can be ascertained, but where the experiments are to be carried out at testing works, such as those of Mr. Kirkaldy, it is immaterial which is specified, as by experience either may be ascertained with equal precision.

No doubt the carrying out of tests will involve the expense of continuous inspection, but the engineer, by vigorously enforcing his specification, will not only gain the esteem of every honest contractor, but will have the satisfaction of knowing that he is obtaining good materials and workmanship.

On the completion of the structure it should be tested with a load slightly greater than its working load, and the deflection noted. This test of workmanship must only be taken in conjunction with the test of materials, as a joint or portion of the structure might be on the point of breaking and yet not stretch sufficiently to materially alter the deflection, and hard brittle iron under the deflection test may appear superior to a better and more desirable quality.

If an iron structure is well designed, erected, and taken care of, the author can see no reason why the term "life of iron work" should not become a thing of the past, as iron imbedded in concrete has been found at the expiration of twenty years as free from decay as on the day of its manufacture.

A few words on the preservation of iron work will, therefore, perhaps not be out of place. It is advisable to coat a casting with oil, paint or tar, as soon as it leaves the sand, as by so doing the hard outer skin is preserved, and when in position it should be again coated. When cast iron is to be covered up, a preparation of coal tar and naphtha is found to answer well; this may also be used to advantage for the upper surface of buckled plates or other forms of road platforms.

Wrought iron, when hot from the rolls, is sometimes brushed over or dipped into boiled linseed oil, but a better and less expensive way, in the author's opinion, would be to brush it over with boiling hot oil when cut to something like its permanent shape, and after its workshop manipulation to again treat it with oil; previous to being erected any abutting surfaces should be also coated with red lead or other metallic paint. A preferable way, if thoroughly carried out, would be to let the iron slightly rust and have it well scraped before its treatment with oil, as by so doing the oxide or blue shales, which in a more or less degree are inseparable from its manufacture, would be removed; they are very apt to peel off after a short time, and bring the paint with them, more especially in a structure subject to vibration. This is not of such vital importance for home work under constant supervision, but for foreign up-country work too much care cannot be taken to preserve the surface of the iron from atmospheric and other influences.

All work should be so designed to allow of its being painted, and plates less than ¼ in. in thickness should never be used. The linseed oil brushed over the iron, as before pointed out, will form a kind of varnish, and is an excellent preparation for the after coats of red lead or other metallic paint, of which not less than two coats should be used, the last being of approved color, and put on after the work is erected in place. On account of the great cost of red lead, other metallic paints are now generally substituted, as that expensive ingredient was often replaced by colored earths, which were mixed with bad oils, and it is needless to state that the quality of the paint is, to a great extent, governed by the oils with which it is made.

All tooled surfaces should be well covered with tallow and white lead. Those wishing to become acquainted with the practical items of ironwork cannot do better than study "Works in Iron," by Mathieson, and experiments on wrought iron and steel, by Kirkaldy; but a year devoted to the vise and bench in a good ironwork or general mechanical shop will be of more service than any amount of reading, and we have it on no less authority than Mr. John Fowler that a mechanical training is absolutely essential to those aspiring to any eminence as civil engineers.

Commercial Prospects.

Our careful and intelligent contemporary, the Philadelphia *North American*, says:

With the increase in the imports of foreign dry goods, there reaches us from Washington a report saying that the whole foreign trade is looking up, and that the promise of a decided improvement in the revenue from foreign imports during the current fiscal year is very marked. At the same time there is an upward tendency in iron, and the trade reports received from England chronicle a return of confidence and better prospects. Nearly a year has now elapsed since the crash of September last, and in that time foreign and domestic supplies have alike been on so reduced a scale that the markets must be short in most lines of articles.

Of the industrial works that suspended during the revulsion many have resumed operations. In others, where the troubles were caused by strikes, the working people have generally failed in their demands, as in the case of the carpet weavers, and in some leading iron works. Industrial establishments are more generally at work now than they were, as in most cases the owners cannot afford to allow their invested capital to be idle. Money has been a drug so long that loans are becoming more active and terms easier. Trade moves along somewhat briskly in the leading commercial centers, and although the volume of it is far below that of the prosperous times that flourished for several years before the panic, the disposition to resume activity is quite manifest. Any attempt to revive the railway movement has been rendered futile by the default of some of the recusant companies upon their July interest.

But, in the meantime, the remarkable increase in the domestic export trade of the republic inspires commercial confidence, and the termination of the cut-throat competition among the railway and steamship lines has a good effect. There can be no doubt that the great increase of our exports, and the balance of trade in our favor, have cut off the supplies of gold and silver received from America by England to such an extent as to have convinced the merchants and bankers of Great Britain that, unless something could be done to change the current, the consequences must be serious to themselves. But it is also true that the stoppage of so many industrial works in America left a state of things here favorable to the renewal of the foreign import trade, and it would not be surprising if we should see a large increase of this business the ensuing fall, winter and spring.

Notwithstanding the vast extent to which our countrymen have engaged in the manufacture of dry goods, the imports of foreign dry goods are still very large, and will probably always continue so, since it is these goods that European fashions control. The enormous shipments formerly made to New York, to be forced on the American markets in any way that could be found open, do not appear to have been profitable to the merchants or manufacturers concerned, a number of the European houses having withdrawn their agencies, and the dry goods auctions having become small compared with what they once were. This disturbance, indeed, pervades most departments of trade.

We do not anticipate a general renewal of activity during the period usually devoted to the fall trade. But there is already evidence that the long stagnation is approaching a termination, and that idle capital, labor and enterprise are gradually forcing movements that seem to be contagious. In most of the trade centers the local trade is brisk, and in the great sea ports the export trade is good and the import trade improving. Altogether the general prospect may be quoted as fair, and as decidedly better than for some months past.

Combined Iron and Steel.

Office of PENNSYLVANIA COMBINED IRON AND STEEL ASSOCIATION,
220 Walnut street, Phila., Aug. 26, 1874.

To the Editor of The Iron Age—DEAR SIR: I notice in your issue of the 20th instant an article from your Philadelphia correspondent, in which he accuses inventors of calling the iron manufacturers of the United States "Bourbons," who learn "nothing and forget nothing," and as he has done me the honor to mention my name with others, I feel it to be my duty to set the gentleman right so far as I am individually concerned, and make it a little "clearer than mud."

Inventors may be somewhat egotistical, but, nevertheless, I am for one proud of the title, notwithstanding your correspondent's seemingly very low estimate of them.

He says: "Mr. Dupuy puts ore and carbon in a sheet iron box, and subjects it to heat and excludes oxygen, then reduces his bloom, sheet iron and all." "Elbridge Wheeler makes steel with an iron *envelope* in the same way."

Now I say that we do nothing of the kind, nor have we ever pretended to make steel at all.

We are not in any sense steel producers, but steel *welders* or *manipulators*, that is, we weld steel and iron together.

Dupuy uses a cylindrical sheet iron case open at the end. We use a rectangular tight box made from flat bars, instead of sheet iron. Dupuy's process would not do our work at all, from the fact that our cases are tight, his are not.

For one I don't think the iron manufacturers will be likely to suffer much from the inventors; as far as my experience has gone they are not willing to spend any money experimenting. Take Bessemer's process, for instance. He had received a large fortune from it in England before manufacturers in the United States considered it worth notice. Another example is the steel tire, for locomotives. A prominent manufacturer of iron tire told me that he was compelled to adopt the machinery to manufacture steel tire or lose his entire trade.

Not a successful manufacturer is there today, in this country or any other, that does not use patent rolls, patent furnaces, and patent processes of different kinds, and all from the brain of the inventor, that your correspondent says is as "clear as mud."

Yours, respectfully, ELBRIDGE WHEELER.

The Landore Siemens Steel Works.

A correspondent of *Engineering* thus describes the visit of the Institution of Mechanical Engineers to the Siemens Steel Works at Landore, Wales:

A visit was first made to the coke ovens, which are situated on high ground, only about 12 ft. below the level of the tops of the blast furnaces, the coal and ore being received on this level direct from the railway. The coke ovens are disposed in double rows, there being arranged between the rows an endless chain worked by an engine situated at one end. In front of each oven is a pulley, or kind of snatchblock, and each oven can thus be drawn by connecting the rakes to a chain, and, after passing this chain over the snatchblock, hooking it on to the main chain. The motion of the latter then hauls the charge out of the oven. The charges generally burnt in these ovens are 4½ tons of coke, and they are kept in the ovens three days and three nights. The product is of a very superior quality, containing only 8 per cent. of ashes, and the loss is said to amount to but 20 per cent. Smaller charges are burnt 48 hours, and the loss with these, it is stated, sometimes reaches 27½ per cent.

From the high level ground the ore and coke are raised to the tops of the blast furnaces by a direct steam lift with a 24 in. ram, and worked with 30 lb. of steam, the hight of the lift being 12 ft. The ore being smelted during our visit was Spanish, about 39 cwt. being used per ton of pig produced. The blast furnaces are two in number, but one only is at present working. One furnace is 66 ft. high by 19 ft. in diameter at the boshes, and the other 55 ft. high by 18 ft. in diameter. The furnaces have closed tops, fitted with bell and hopper, and the blast supplied to them is heated by three of Cowper's regenerative gas stoves. These stoves, however, are not heated by the gas from the furnaces, but by gas made in separate gas producers, the furnace gas being used for heating the steam boilers only. The gas procured from the separate producers contains much less dust than the furnace gas, and hence by using in the stoves are more easily kept clean. As we have said, there are three of Mr. Cowper's stoves for the two furnaces, and it is the practice to keep one stove "on blast" and two "on gas" at one time, each stove being traversed by gas for three hours, and in the contrary direction by blast for an hour and a half. The furnaces are blown with six tuyeres, and the blast is supplied by two very fine vertical condensing blowing engines, constructed by Messrs. Kitson & Co., of Leeds, these engines having 45 in. steam cylinders, 100 in. blowing cylinders, and 5 ft. stroke.

From the blast furnaces the visitors passed to the principal building containing the furnaces for the Siemens-Martin process. This building contains sixteen of these furnaces, each capable of working 6-ton charges, while the smaller building contains eight similar furnaces. The main building consists of a large central span, with two smaller spans on each side. The central span covers a pit, over which a traveling crane works, and down the center of which is an elevated railway on which run the wagons which receive the ingots. On this line there is also a portable steam crane. The furnaces are ranged eight on each side of the pit, and at a short distance from its edge, while in connection with each furnace there is a kind of branch pit in which is laid a line of rails extending out in the main pit. On these rails runs a wagon carrying the ladle in which the steel is received from the furnace, the ladle being then run out over the ingot molds, which are arranged in straight rows. The outer spans of the buildings cover the space devoted to the workmen charging the furnaces, as well as to stores of ore and steel scrap, &c. The Siemens-Martin process, and the nature of the furnaces employed, have been so frequently described in our columns that it will be unnecessary for us to repeat the description here. We may, however, mention that at Landore the average charge may be taken as follows: 62 per cent. of pig iron; 20 per cent. of steel scrap; 7 per cent. of spiegeleisen and enough African ore to yield about 11 per cent. of iron. When working without scrap, the charge consists, we believe, of about 4½ tons of pig iron, 24 cwt. of ore, and about 10 cwt. of spiegeleisen. The time occupied in melting the bath of pig iron is from 4½ to 7 hours, and the time of working off a charge about 10 hours.

In the construction of the Siemens-Martin furnace the nature of the bricks used for the lining forms a most important item, and after leaving the furnaces the party next proceeded to the brick works, where bricks are made containing 98 per cent. of silica, the remaining 2 per cent. being alkaline matters. These bricks are made from selected stones, consisting of almost pure silica, these stones being first broken in one of Marsden's stone breaking machines, and then crushed between powerful rolls. Carr's disintegrator has also been used for reducing the broken stone, but the product derived from it is too fine for general use, and is only employed to mix with the coarser crushed stone obtained from the rolls. The crushed stone—which looks a most unpromising material to make bricks of—is mixed with lime water and pressed in brick molds worked by hand. The resulting bricks are, when first made, very tender, and they are carefully placed in a drying shed heated by flues passing beneath the floor. Having by this drying acquired more tenacity, they are then stacked in "bee hive" kilns, each containing about 33,000 bricks, and are burnt for about five days. The stacking of the still tender bricks in these kilns requires considerable skill and care, but the manufacture is now carried on with great success, and the bricks obtained are sufficiently hard and tenacious to stand much rough usage.

The brick making department, like the blast furnaces and the buildings containing the steel furnaces, stands on the low level ground, and from this a somewhat long walk up a railway incline brought the visitors back to the high level, on which the rolling mill is situated. The rolling mill occupies a very fine building, with a range of boilers on one side. The reheating furnaces are, of course, all Siemens regenerative gas furnaces, those used in connection with the rail mill being very long, with four doors for charging and withdrawing blooms. The blooming hammers are eight-ton single action hammers, with 32½ in. cylinders and 7 ft. stroke. They have been constructed by Messrs. Thwaites & Carbutt, of Bradford, and three of them are erected, while two others are, we believe, on the ground. There is also an eight ton forge hammer by the same firm. At one end of the mill is one of Mr. F. W. Webb's tire mills, driven by a pair of vertical engines half sunk below the floor level. The whole arrangement was made by Messrs. Craven, of Manchester, and is very neat. The rail mill is driven by a Ramsbottom reversing engine, constructed by Messrs. Thwaites & Carbutt, of Bradford. This engine has a pair of 35 in. cylinders, with 4 ft. stroke, and is geared so as to make 3¼ revolutions to one of the rolls. Beyond the rail mill is a rail saw, of very neat design, by Messrs. Kitson, of Leeds. From the rail mill the visitors proceeded to the other end of the mill, where there is a pair of vertical engines, by Messrs. Hicks & Co., of Bolton, driving a bar mill and a wire mill. The latter was run to show the visitors the process of wire rolling, a process always interesting, but especially so when it is performed with the unusual smartness exhibited at Landore. In this mill the wire steel is brought down from 1⅛ in. to ¼ in. in diameter in 14 passes, and so well are the rolls manned that during the latter part of the rolling five bends are in between the rolls at once, or, in other words, the single bar is suffering different degrees of reduction at five different points of its length. The handling of the bars and their quick return through the rolls require much skill and training, and we never saw a gang of men work more smartly than those at Landore. In the order and neatness which pervade throughout them they are perfect models of their kind.

"Modern Conveniences."

A very sensible writer in the Philadelphia *Ledger* says:

"Much coin, much care," used once to be quoted as a familiar proverb. Now "coin" is a rare article; though its paper representative gives quite as much trouble—and the want of coin or of paper gives more care to the individual lacking, than any amount of redundance would cause. Money has really fallen in esteem since the proverb above quoted was a favorite. People expend more, and turn their money and test their credit in the purchase of commodities and conveniences which our ancesters were content to live without. They were content, because the conveniences which are now to be had in dwellings of moderate cost even were not conceived of. The housekeeper of one hundred years ago, could she revisit the world, would be more than amazed at the appliances for living at ease, which she would find. And yet the housekeeper of to-day "is not happy." She has really as much toil as ever, though in other directions. To keep a house in regular and orderly progress now, puts the old proverb in a new dress. The more "improvements" the more care. And the last "modern improvement" brings modern vexation to match.

There is one advantage, however, about the mechanical and scientific additions to house furnishing and building which the ladies ought to value. They compel the husband, if he is a husband worth having, to share the household cares and labors and anxieties. Few ladies profess to know anything about water pipes and gas meters and heaters, and all the rest of the circle of mechanical apparatus which is embraced in modern architecture and house furnishing. The husband must be appealed to in cases where, in his grandmother's days, he would hardly have been consulted. And a husband with head for hydraulics, and hands for a monkey wrench, is a "convenience" which housekeepers fully appreciate.

But, as in many other good things, so in house-building and the general planning of cities for health and cleanliness, we are far enough from being perfect. It is wonderful how much is yet to be learned; and how much that is learned is yet to be applied in the great essentials of ventilation, draining, and that actual cleanliness which does not merely hide, but abates or removes unclean and unhealthy things. There is no sufficient reason why, with the crowds of humanity which dwell in our cities, everything offensive should not be removed or abated. The crowd causes the accumulation of disagreeables. But it is not a crowd of cattle without reason. It is a crowd of rational beings, who ought to know enough to devise means for their own comfort; and who should be people of energy enough to put those means in exercise. Too much ingenuity is wasted in devising modes to make all things endurable; whereas the true course would be to prevent the evil at its source. It is true that many advances have been made in this direction. Epidemic diseases are more rare and less fatal in their consequences, and some of the fearful scourges of old times are now known only in history. What has been done may be still further prosecuted. In the household, particularly, since whatever is really wanted can be discovered, we need a cultivation of the principles of hygiene—the prevention of disease—a course infinitely better than any curative process. The warm season now upon us should spur all who value health to care in diet, in cleanliness, and in exercise. One point which the *Ledger* has often made, it is worth while to repeat. The morning sun should have a look into every house, if only for half an hour. The entire exclusion of sun and air may make a house seem cooler. But it is the damp, unhealthy coolness of a vault, and is really as little conducive to true comfort as to health.

Constantinople has a very primitive fire department. Watchmen from the fire towers announce the commencement of a conflagration, and big guns on the top of Fire Hill, on the Bosphorus, signal its existence to the dwellers in the suburbs. Meantime from the watch towers issue forth the messengers, stripped for the race and carrying a short pike of authority. These run at full speed through the crowded streets, yelling to clear the way, carrying to the police stations and the engine houses the name of the quarter; at each station fresh men take up the race, and in half an hour the most distant police station in the city can tell you just where the fire is. The fire companies come forth and carry their engines—little boxes two feet square—on their shoulders, the hose on their backs. With these equipments they rush through the streets yelling like demons. Arrived at the fire, they deposit the engine on the ground, water carriers bring the water in great leathern bottles, and the pumps work lively and throw a very respectable stream. When the fire gets so near the engines as to be uncomfortable, they haul off a little farther, and so steadily retreat before it.

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Special Notices.

1776. 1876.

INTERNATIONAL EXHIBITION.

Office of the U. S. CENTENNIAL COMMISSION, PHILADELPHIA, PA.

In accordance with the several Acts of the Congress of the United States, providing for the celebration of the

CENTENNIAL ANNIVERSARY

of American Independence, there will be held in FAIRMOUNT PARK, Philadelphia, in the year 1876, an

INTERNATIONAL EXHIBITION

of Arts, Manufactures, and Products of the Soil and Mine.

The exhibition will be opened on the 19th of April and closed on the 19th of October.

APPLICATION FOR SPACE.

To secure space for exhibits in the buildings or the park, early application should be made. The necessary forms for application, together with the regulations for exhibitors and needed information, will be forwarded on application to the office of the Centennial Commission.

A. T. GOSHORN, Director-General.

J. L. CAMPBELL, Secretary.

The Chilian Exposition.

Packages for this exposition take the following route: Shipped at the dock of the Pacific Mail Steamship Co. in New York, or San Francisco, they are, upon the payment of one dollar, gold, for each package not weighing more than 2000 pounds or measuring not more than 20 cubic feet, taken to Panama and delivered to the South American Steamship Co., whose steamers carry them to Valparaiso, and there deliver them to the agent of the Exposition, who attends to their transportation, by railway, to the place of exhibition. The one dollar, gold, is the only expense of transportation to the place of exhibition, Santiago. An exhibitor may send as many packages as he pleases under this regulation. Heavier or larger packages may be shipped per same line at low rates under special contract. Articles will be received at Santiago till August 25, 1875, but to secure space for their exhibition applications must reach there January 1st, 1875, and leave New York December 1st, 1874. Machinery for Manufacturing, for Mining, and used in Agriculture, are especially invited. Particulars may be obtained by addressing any one of the United States Commissioners for the Exposition, any Chilian Consul in the United States, or

A. VILLARROEL, Corresponding Agent, *No. 52 Pine Street, N. Y.*

Wanted.

Traveling salesmen and resident to canvass the Hardware and Stove Trade in every city and in the country for a salable article on commission. No trouble. Address **B. S.,** office of *The Iron Age,* 10 Warren St., N. Y.

Wanted Situation.

A young man 24 years of age, desires a situation in the Hardware business. Has had five years' experience in General Hardware, and can give the best of references as to character and capability. Address,

DUDLEY W. SMITH, Wooster, O.

Wanted.

A situation as superintendent of a rolling mill, by a man who has a practical knowledge of Merchant, Guide and Hoop Rolling, also of puddling. Understands Roll Turning, Mill Building and Repairing. Good reference given. Address

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Auction days Tuesdays and Thursdays, and all other times at private sale (quoting auction prices) until the whole is disposed of. Terms liberal.

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A situation as bookkeeper or cashier of an iron works, a hardware business, or in the coal trade, which the advertiser understands in all its branches. Highest references of character, capacity, &c.

Address, **H. D.,**
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One 150 Horse-Power Stationary Engine, with heavy fly wheel, all complete, and nearly as good as new.

Three Return Tubular Boilers, (70 three inch tubes each), 15 feet long, complete with steam drum, fronts, valves, grates, &c., suitable for the above engine.

One 10 Horse-Power Portable Engine of our own make, complete, with two driving pulleys, "Judson" governor, &c., nearly new, and in excellent order.

One 30 Horse-Power Portable Engine, with circular saw mill, saw and belt complete, in first rate order.

Three 4 Horse-Power Stationary Engines. Cylinder, 4 in. by 10 in.

One 30 Horse-Power Stationary Engine, as good as new, complete, with "Judson" governor, fly wheel, &c.

One 30 Horse-Power Stationary Engine, in good running order, but not as new as the above.

One 16 Horse-Power Stationary Engine, with new vertica lboiler.

One Otis Hoisting Engine, in good order.

Two Flue Boilers, 26 ft. long, 42 in. diam., each with two 14 in. flues, iron front, grates, &c., in good order.

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One 7 Horse Portable Engine, of our own make, used only a few months, and in perfect order.

Two No. 6 Sturtevant Blowers. Two No. 4 McKenzie Blowers. One No. 6 Andrew's Centrifugal Pump. One No. 6 Turbinate Centrifugal Pump. Three No. 0 Cameron Pumps. One No. 2 Cameron Pump. One Knowle's Pump. One Earle Pump.

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Analysis of Average New Bed Pure Ore.		*Analysis of No. 1 Bessemer Pig.*	
Metallic iron	68·240	Undetermined matter and loss	·134
Oxygen with iron	26·010	Silicon	1·019
Water	·380	Carbon	3·821
Insoluble silicous matter	4·320	Phosphorus	·048
Sulphur, practically none		Sulphur, practically none	
Phosphorus	·038	Calcium	·140
Alumina	·280	Metallic iron	94·838
Lime	·140		100·000
Undetermined matter and loss	·592		
	100·000		

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For particulars, address "General Superintendent, American Institute, New York."

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The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,

Brick Pattern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flask and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools.

The Works can be put in immediate operation. A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. ***If not sold in a reasonable time it will be for Rent.***

For particulars apply to

J. W. ROSEBERRY, Trustee,
Pottsville, Pa.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Sept. 3, 1874.

The dullness reported for so many weeks past in Wall street still continues in all departments of financial business, and the tendency, until Tuesday, was toward lower prices for everything offered for sale. The money market continues easy at 2 @ 2½ for call loans. Prime mercantile paper is discounted at 5 @ 6 per cent. for short date, and 6½ @ 7½ for long date.

The following is a comparison of the bank averages of the past two weeks :

	Aug. 22	Aug. 29.	Differences.
Loans	$278,576,000	$278,319,800 Dec.	$256,200
Specie	19,554,900	18,638,100 Dec.	916,800
Leg. Ten.	65,891,400	67,282,600 Inc.	1,391,200
Deposits	234,864,100	235,000,100 Inc.	136,000
Circulation	25,820,000	25,803,300 Dec.	16,700

The gold market has been very steady and the premium has fluctuated within narrow limits. The following shows the daily range :

	Highest.	Lowest.
Thursday	109¾	109⅝
Friday	109¾	109¾
Saturday	109¾	109⅝
Monday	109⅞	109¾
Tuesday	109¾	109⅝
Wednesday	109⅞	109¾

Gold has been in good borrowing demand during the week, and in most instances currency has been advanced on it in equal amount without interest. On Thursday the Treasury sold $1,000,000 at 109·60 @ 109·65⅛.

In the stock market but little activity is reported. The transactions have mostly been small, with principal dealings in Lake Shore, Western Union, Union Pacific, Pacific Mail, Wabash and Erie.

Government bonds have been dull and steady. The market is without feature of interest.

The following tables show the course of foreign trade during the week :

IMPORTS.

	1872.	1873.	1874.
Total for week	$11,092,938	$8,465,334	$9,525,261
Prev. reported	288,972,269	267,596,186	265,517,587
Since Jan. 1	$300,065,207	$276,061,520	$275,042,848

Included in the imports of general merchandise for the week are :

	Quant.	Value.
Anvils	138	$1579
Brass goods	34	4,775
Bronzes	28	4,612
Chains and anchors	93	4,508
Copper		115
Cutlery	169	51,721
Gas fixtures	2	1,083
Guns	101	16,660
Hardware	88	9,467
Iron sheet, tons	13	4,319
Railroad bars	7,529	144,475
Iron, cott. ties	1,200	3,508
Iron ore, tons	787	4,310
Iron, other tons	234	13,805
Lead pigs	4,408	27,103
Metal goods	322	29,767
Nails	13	1,419
Needles	15	9,907
Old metal		3,318
Platina	1	2,761
Plated ware	2	131
Per. caps	27	5.665
Saddlery	9	1,435
Steel	3,839	33,418
Spelter, lbs	109,783	5,457
Tin, boxes	23,029	189,531
Tin, 1,014 slabs, 110,900 lbs		22,630
Wire	36	3,880
Zinc, lbs	166,952	9,723

EXPORTS EXCLUSIVE OF SPECIE.

	1872.	1873.	1874.
For the week	$4,695,445	$5,420,644	$5,588,067
Prev. reported	142,491,440	184,808,583	192,271,425
Since Jan 1	$147,186,885	$190,229,227	$197,859,492

EXPORTS OF SPECIE.

Total for the week	$642,456
Previously reported	39,602,471
Total since January 1, 1874	$40,244,927
Same time in 1873	89,224,658
Same time in 1872	56,174,631

Government bonds closed as follows :

	Bid.	Asked.
U. S. Currency 6's	117½	117½
U. S. 6s 1881, reg.	117¾	117¾
U. S. 6s. 1881, cou	118½	118½
U. S. 1862, 5-20 reg	112¾	—
U. S. 5-20 1862, cou	112¾	—
U. S. 5-20 1864, reg.	114½	—
U. S. 5-20 1864, con.	115½	116
U. S. 5-20 1865, reg.	115¾	—
U. S. 5-20 1865, con.	116½	117
U. S. 5-20 1865, reg. new	115¾	116
U. S. 5-20 1865, cou	116¾	116½
U. S. 5-20 1867, reg.	116½	116¾
U. S. 5-20 1867, con.	117¾	117¾
U. S. 5-20 1868, reg.	116¾	—
U. S. 5-20 1868, con.	117¾	118
U. S. 10-40 reg	110¾	110¾
U. S. 10-40 con	111¾	111½

The following were the highest and lowest prices of stocks to-day :

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	102½	102⅜
Lake Shore	74⅛	73¾
Rock Island	102⅛	101⅞
New Jersey Central	105	103
Del. Lack. and Western	109	108¾
Wabash	35⅞	34
Western Union Telegraph	78⅛	77¾
Atlantic and Pacific Preferred	15⅜	15⅛
Northwestern	38⅛	38⅛
Do. Preferred	57¾	57¾
Milwaukee & St. Paul	35⅛	35
do Preferred	54	53¾
Pacific Mail	47⅞	47⅜
Erie	35⅛	34
Ohio & Mississippi	25	24⅝
Boston, Hartford & Erie	1⅜	1⅜
Union Pacific	30⅞	29⅞
C. C. & Ind. Central	11⅜	10¾
Hannibal and St. Joseph	25	25
Quicksilver	34¼	33¾
Consolidated Coal	47	47

GENERAL HARDWARE.

Notwithstanding the disturbing influence which the decline in prices of Domestic Hardware, noticed last week, has had upon the market, we are able to report a more satisfactory condition of affairs since the opening of the month. There are a good many buyers in the city who are leaving orders for general assortments, and mail orders, though small, are very plentiful, and will aggregate fair amounts. The declines published in our last issue are met by competing houses.

In our issue of the 13th ultimo, we noticed the partial destruction by fire of the works of the Enterprise Mfg. Co. of Pennsylvania, and it was then stated that the company would take energetic measures to enable them to resume operations as early as possible. It gives us pleasure to announce to the trade that the company have more than fulfilled our expectations in this regard, as will be seen by the following statement: The fire occurred on Tuesday, the 11th of August; on the 25th work was resumed. They have now been under roof for eight days, and by the 25th of October they expect to be in operation as before the fire.

There is a decided improvement in the demand for Foreign Hardware this week compared with last. The orders, which are numerous, are marked by the same caution against overstock which has characterized the trade since the financial disaster a year ago. It is a notable feature, and one that tells forcibly the condition of out-of-town markets, that almost all the orders placed so far are for immediate shipment. There are no changes in the matter of prices to report, and, with few exceptions, the tone of the market is decidedly strong. We were shown a letter, dated at Sheffield, 11th ultimo, from the well known house of George Wostenholm & Son, regarding the future of prices and other matters, in which the writer remarked, that as other houses in the trade had yielded to the demands of the workmen for increased wages, they would be obliged to follow. With regard to supply, it was stated that already the amount of orders on hand was very large, and it was not improbable that their goods would be in short supply before the close of the present season. This information seems to set at rest the rumor, which had gained some credence, of lower figures for these goods, and holders are strong in their views.

We notice increased activity in the Nail market, with the strange anomaly of a lack of the slightest indication of improvement in its tone. The same irregularities exist which we have so often noticed, and we repeat the quotation of last week, viz. : 10d., nominally, $3·75 @ $3·85, net. Small orders are easily placed at $3·70, and this figure could be shaded for a fair order.

Dealers in House Furnishing Goods, Tinners' Trimmings, etc., report a marked improvement in the demand since the opening of September. The discounts established by the manufacturers for Deep Stamped and Retinned goods, viz. : 25 per cent. from list, is, as far as we can learn, lived up to, and we hear of no disposition to shade prices. Planished Tin Ware is quoted at discount 25 per cent., and common Stamped Tin Ware discount 10 per cent. E. Ketcham & Co. quote Sargent & Greenleaf's Patent Adjustable Elbows at the following list, less discount 10 @ 20 per cent., according to quantity :

	Char. Iron. Per doz.	Russia. Per doz.
3 inch	$2·50	$ 5·00
4 "	3·25	7·00
4½ "	3·75	8·00
5 "	4·25	9·50
5½ "	4·75	10·75
6 "	5·25	1·75
7 "	6·25	13·75
8 "	7·25	15·75
9 "	8·25	17·75
	Gal. Iron. Per doz.	**Tin. Per doz.**
2 inch	$ 3·00	$ 2·25
2½ "	3·50	2·75
3 "	4·00	3·25
4 "	5·00	4·25
4½ "	5·75	4·75
5 "	6·50	5·50
5½ "	7·50	6·50
6 "	8·00	7·50
7 "	9·50	9·00
8 "	11·00	11·00
9 "	12·50	13·00
10 "	14·00	15·00

Importers of French Window Glass report a firm market, with upward tendency and increased demand. While there is no change in our quotation this week, it is worthy of notice that in extreme discounts there has been an advance of 7½ per cent. within a few days, consequent on late European advices.

The list prices of Merriman's Blind Fasts have been changed to the following, the trade here selling at net list :

BLIND FASTENERS.

Double Jointed.

No.					Per doz. set
1	for 1½	to 2	inch, all Brass		$4 75
1	" 1½	" 1¾	" "		4·50
1	" 1¾	" 2	"	Brass Catch	3·62½
1	" 1¾	" 1¾	" "	" "	3·25
1	" 1¾	" 1¾	" "	" "	3·00
1¼	" 1¾	" 2	" "	" "	3·25
1¼	" 1¾	" 1¾	" "	" "	3·00
1¼	" 1¾	" 2	"	Mall. Iron Catch	2·62½
1½	" 1¾	" 1¾	" "	" "	2·25
1½	" 1¾	" 1¾	" "	" "	2·00
2	" 1¾	" 2	"	all Brass	4·50
2	" 1¾	" 1¾	"	"	4·25
2	" 1¾	" 2	"	Brass Catch	3·25
2	" 1¾	" 1¾	"	"	3·00
2	" 1¾	" 1¾	"	"	2·62½
2½	" 1¾	" 2	"	"	3·00
2½	" 1¾	" 1¾	"	"	2·62½
2½	" 1¾	" 1¾	"	"	2·25
2½	" 1¾	" 2	"	Mall. Iron Catch	2·25
2½	" 1¾	" 1¾	"	"	2·00
2½	" 1¾	" 1¾	"	"	1·62½

Single Jointed.

3	for 1	to 1½	inch, all Brass		$3·50
3	" 1	" 1¾	"	Brass Catch	2·62½
3	" 1	" 1½	"	"	2·25
4	" ⅞	" 1¾	"	all Brass	3·25
4	" ⅞	" 1½	"	Brass Catch	2·00
5	" 1	" 1½	"	"	2·00
5½	" 1	" 1½	"	Mall. Iron Catch	1·31¼
6	" ⅞	" 1½	"	all Brass	2·75
6	" ⅞	" 1½	"	Brass Catch	1·62½
6½	" ⅞	" 1½	"	Mall. Iron Catch	1·00
7	" 1	" 1½	"	Brass Catch	1·12½
7½	" 1	" 1½	"	Mall. Iron Catch	·81¼
8	" ⅞	" 1½	"	Brass Catch	1·00
8½	" ⅞	" 1½	"	Mall. Iron Catch	·65

The Lawrence Curry Comb Co., of this city, have issued the following list for their goods, which is subject to discount 20 per cent. These goods have only been recently introduced, and are meeting with a favorable reception. They are patented, and are made with two continuous wire braces running across the back and through the bars, are well finished, strong and durable :

PRICE LIST OF MALLEABLE IRON FRAMED COMBS.

	Open Backs.		
No. 50, 6 Bars, Heavy			$1·10
No. 51, 6 "	Iron Japanned		1·80
No. 151, 6 "	Galvanized		2·10
No. 251, 6 "	Brass		2·50
	Close Backs.		
No. 60, 6 Bars, Heavy			$1·35
No. 61, 5 "	Double Frame		2·00
No. 62, 6 "	Iron Japanned		2·15
No. 63, 6 "	Double Frame		2·25
No. 64, 7 "	Iron Japanned		2·40

PRICE LIST OF THE PERFECT COMB.

	Open Backs.	Per dozen.
No 20, 6 Bars,	Iron Japanned	$1·50
No. 120, 6 "	Galvanized	1·80
No. 220, 6 "	Brass	2·25
No. 21, 8 "	Iron Japanned	2·00
No. 121, 8 "	Galvanized	2·50
No. 220, 8 "	Brass	3·50
	Close Backs.	Per dozen.
No. 30, 6 Bars,	Iron Japanned	$1·65
No. 130, 6 "	Galvanized	2·00
No. 230, 6 "	Brass	2·75
No. 31, 7 "	Iron Japanned	2·25
No. 131, 7 "	Galvanized	2·75
No. 231 7 "	Brass	4·00

The list price of Blake's Traps No. 0 has been changed to $2·60. Chains for Blake's Traps Nos. 0, 1, 2, 2¼, 2½, are now $1·35, and for Nos. 3, 4, 5, $1·60. A discount of 25 per cent. is taken from both Traps and Chains.

No change in the price of Horse Shoes was made on the 1st instant. Fernald & Sise have taken the agency for French's Patent Ox Shoes, which are a handsome article, which they quote as follows : Iron, 13 cents per lb. ; Steel plated, 16 cents per lb.

We invite the attention of dealers in Railroad Supplies to the advertisement, on 10th page, of Potter, Hoffman & Co., No. 110 Liberty street, agents for Bay State Iron Co., Boston, Mass., manufacturers of Homogeneous Plates, Rails, &c. ; also, agents for Crucible Steel Tires, Axles, Forgings, &c., Chrome Tool Steel and Spring Steel, Nichols, Pickering & Co.'s Springs, Patent Steel Tired Wheels, &c.

The Northampton Cutlery Co., No. 45 Murray street, offer to the trade a good assortment of American Table Cutlery, Cook, Butcher, Shoe and Hunting Knives. They are also sole agents for Rogers Cutlery Co., manufacturers of Plated Forks and Spoons. Their advertisement will be found on page 10.

The Hart, Bliven & Mead Mfg. Co. have issued a new discount sheet, under date of the 1st instant, quoting prices on goods of their own manufacture about 10 per cent. less than those previously in force. The discount sheet is introduced by the following preface :

With a desire to meet the reasonable views of dealers, who distribute our productions, and with disposition and ability to meet competition, we have the pleasure to present discount sheets of our autumn prices for articles named in our Catalogue of 1873, and Appendix No. 1, 1874.

We would ask for a careful examination and comparison of our goods, to verify our former declarations of improvement and perfection in quality, style, etc.

The new discounts on goods of their own manufacture are as follows :

Page.	Dis. per cent.
2, Nickel Plated Steel Squares	50
2, " " " " by the case	50&10
Add for Nickel Plating—	
All 1 ft. Squares, per doz. extra,	$2·50, net
All 1½ in. wide Sqs. " "	3·00, net
2 in., Nos. 3, 4, 5 and 6 " "	3·50, net
2 in., Nos. 1, 2, 2½, 15 and 100 " "	4·00, net
2, Steel Rules " "	3·00, net
Parties who become entitled to the full discount on Steel Squares, will be allowed 5 per cent. discount on our prices for Nickel Plating.	
2, Steel and Iron Rules	50
3, Carpenters' Steel Squares	50
3, Carpenters' Iron "	50
Carpenters' Steel and Iron Squares, by the case	50&10
4, Socket Firmer Chisels, No. 1, or Extra	60&5
4, " " " No. 2	60&5&10
4, Socket Corner Chisels, No. 1, or Extra	60&10
5, Socket Framing Chisels, No. 1, or Extra	60&10
5, " " " No. 2	
5, Carpenters' Slicks, No. 1, or Extra	60&10
6, Carpenters' Drawing Knives, No. 1 or Extra	60
6, Carpenters' " No. 2	60&10
6, Coach Makers' " No. 1, or Extra	60
7, Wagon Makers' " No. 1, or Extra	60
7, Farmers' "	50&10
7, Shingle "	60
8, Handles, all kinds	50
9, Screw Drivers	55
9, Socket Scratch Awls	40
9, Common Scratch Awls	50
10, Ice Axe and Picks	50
10, Heavy Ice Picks, (See Appendix, folio 37)	33⅓
10, Cold Chisels	33⅓
10, Cheese and Butter Tryers, (See Appendix, folio 37)	50&5
11, Cast Shoe Hammers	50
11, Cast Nail Hammers	55
12, Hammers, all kinds	50
12, Shingling Hatchets	40
13, Cotton Hooks	50
13, Plumbers' Ladies	55
14, Box Chisels	50
14, Cabinet Makers' and Quilt Frame Clamps	60
15, Bench Screws, (Change list, 1¼ in. $20·50)	60
15, Blacksmiths' Drills	60&5
16, Wood Handle Garden Forks, No. 1	55&5
16, Iron " " No. 10	55&5
16, Iron Handle Garden Trowels, No. 1	50
16, Patent Floral Sets	50
17, Japanned Plumb Bobs, No. 1	60
17, Japanned " No. 5	70
17, Lead and Brass Plumb Bobs	60
18, Japanned Barrel, Tower and Shutter Bolts	60
19, Japanned Square Spring and Necked Bolts	60
19, " Lever Bolts	50
20, " Chain Bolts, Nos. 1 and 2	60&10
20, " " " No. 3	60
21, Figured Enameled Barrel and Square Bolts	60&10
22, Figured Enameled Bottom and Square Bolts	60&10
23, Figured Enameled Chain Bolts	60&10
24, New Pattern Door Bolts	50
24, Japanned Staples	55
24, Cast Brass, Straight Cupboard Bolts	60&10
25, 26, Brass Barrel Bolts	60
26, Figured Enameled Cupboard Bolts	60&10
27, Flat Cupboard Bolts	60&10
27, Mortise Front Door Bolts	60
28, 29, Brass Bolts, all kinds	60
30, Brass Flush Bolts	60
31, Brass Chain Bolts	60
32 to 34, Chain Door Fasteners	55
34, Figured Enameled Cupboard Latches	60&10
35, 36, Japanned Rural Cupboard Catches	60
36, Figured Enameled Cupboard Catches (See Appendix, folio 4)	60
37, New Pattern Closet Catches	55
37, Figured Enameled French Window Catches	60&10
38, French Window Catches, Nos. 307 to 314	60&10
38, " " " Nos. 302 to 306	60&10
39, Figured Enameled Flush Cupboard Catches	60
39, " " Cupboard Turns (See Appendix, folio 10)	60
40, Brass Rural Closet Catches	60
40, 41, Brass Plate Cupboard Catches	60
41, Brass Show Case Catches	60
42, Flush Ring Show Case Catches	60&5
42, Brass Flush Rings	60&10
42, 43, Door Buttons, all kinds except Nos. 4 & 5	60
43, Door Buttons, Nos. 4 and 5	33⅓
44, Brass Drive and Screw Hooks	60
45 to 51, Wardrobe, Ceiling, Clothes Line & School House Hooks	60&10
51 to 58, Hat and Coat Hooks. Change list— Per gross	$3·30 4·00 3·70 4·50 60&10
Nos.	11 12 111 112
59, Harness Hooks	60&10
60, Lamp and Cabin Door Hooks	60
61, Fancy Bird Cage Hooks	60
61, Cottage Bird Cage Hooks, No. 1	70&5
61, " " " No. 2	70
62, Figured Enameled Bird Cage Hooks, No. 10	60
62, Paper Clips	55
62, Pen Racks	50
63, Paper Flies	55
64, Spiral Spring Gate Latches	60&10
64, Right and Left Gate Hinges, No. 1	60&10
65, New England Gate Hinges, No. 2	65&10
65, New York State Gate Hinges, No. 3	60&10
66, Plate Hinges	55
66, Barn Door Rollers	65&10
67, New Pattern Barn Door Hangers	60&10
67, Extra Heavy " "	65&10
67, New England " "	65&10
68, Barn Door Rail, Nos. 0, 1 and 2	65&5
68, " " " Nos. 3, 4 and 5	65&7½
68, Barn Door Stays	60&10
68, Sliding Door Rail	60
69, Sliding Door Sheaves	50
69, Barn Door Pulls	60
70, Foot Scrapers	60
71, Frame Pulleys, No. 0	60&10
" " Nos. 1 and 2	60
72, Axle Pulleys, Nos. 5, 10, 15, 20	65&10
72, " " Nos. 25, 30, 35, 40, 45	60&10
73, " " Nos. 50, 55, 60	60
73, Side " add 2¼ in., per doz., $2·50	60
74, Incased Screw Pulleys	60
74, Screw Pulleys, add 2¼ in., per doz., $2·20	60
75, Upright and Yard Line Pulleys	60
76, Tackle or Awning Pulleys (see Appendix, folio 58)	60
77, Hot House Pulleys	60
78, Sash Cord Irons and Sash Lifts	60
79, Sash Lifts and Sash Centers	60&10
80, Sash and Trunk Rollers	60
81, Window Springs, Window Spring Bolts and Sash Props	60
82, Shutter Lifts and Stubs and Plates	60&10
83, " Screws and Shutter Bars	60&10
84, Boston Shutter Hooks	60&10
84, New York Shutter Bars, Brass	60&10
84, " " " Plated	65&10
84, Hart Pattern "	60
85, Sash Fasteners, No. F	65&10
85 to 87, Sash Fasteners, all Nos. except F	60&10
88, Figured Enameled Sash Fasteners, No. 75	50
88, " " " No. 70	65&10
89, Drawer Pulls, Nos. 70 and 80	60&10
89, " Nos. 90 and 100	60
90, "	60&10
91, " Nos. 3 to 603½	60&10
91, " Nos. 4 and 104	60
92, " Nos. 7 to 307	60
92, " Nos. 6 to 606½	60
93, " Nos. 5 to 105¾	60&10
93, Japanned Lifting Handles	60
94, French Window Shutter Handles	50
94, Brass Lifting Handles	60
95, Wrought Chest Handles	60
95, Door Pulls	60&10
96, " Brass and Plated	60
97, Light Thumb Latches	55&5
97, Heavy "	50&10
98, Door Handles, No. 90	60
99, Pittsburgh Thumb Latches, No. 100	60&10
99, Barn Door Latches, No. 15	60&10
100, " " No. 25	60&10
101, Oblique Store Door Handles, Nos. 10 and 20	60&10
101, Oblique Store Door Handles, No. 30	65&10
101, " " No. 130	60
101, " " No. 230, Change list, 276 per dozen	60
102, Fig'd Enam'd Store Door Handles, No. 180	65&10
103, Bronze Metal " " No. 70	60&10
103, Fig'd Enam'd " " No. 80	70&10
104, Door Handles. Change List; No. 40, per dozen, $53; No. 50, per dozen, $84	60
105, Figured Enameled Surface Chest Handles	60&10
106, Japanned Surface Chest Handles	65&10
107, " Flush "	60&10
108, Japanned Flush Drawer Handles	60&10
108, " Flush Trap Door Rings	60&10
109, Thread Escutcheons, change list, common	60
Per gross	$0·90 1·00 1·10 1·20
Inch	9-16 ⅝ 11-16 ¾
109, Bed Keys	50
110, Bedstead Fastenings	65&10
111, Iron Plate Casters	40
111, Porcelain Wheel Plate Casters	45
111, Brass " "	35
111, Piano Casters	40
112, Iron Bed Casters	30
112, Wood, Porc. and Brass Wheel Bed Casters	35
113, Globe Wheel Bed Casters	35
114, Bracket Bed Casters	35
114, Round Shallow Socket Casters	40
115, Deep Socket Casters	35
116, Truck Casters	35
117 to 119, Steelyards, all kinds	50
119, Grindstone Fixtures, Nos. 1, 2 and 3	50
120, " " Nos. 4 to 8	60&5
120, " " Nos. 9 to 11	60
121, Well Wheels	60
121, Chain Pump Fixtures	50
122, Ox Balls	60
123, Shelf Brackets, No. 15	60
123, " " No. 20 (see Ap'dix, folio 23	65&10
123, " " Nos. 40, 50 and 60	55
123, Shelf Brackets, No. 30	65
124 to 126, Connell's Patent Door Bells, (See Appendix, pages 28 to 32, for Reduced List)	50
127, House Bells on Carriages	70&10
127, Mortise Bell Cranks. Change List, No. 5, per gross, $45	60&10
128, Bell Cranks. Change List, No. 10, per gross, $6; No. 11, per gross, $5·50	50&10
128, Check Sp'gs, Bell Spikes and Cork Pressers	60&10
128, Towel Rollers	50
129, Iron Fire Dogs	60
130, "	50
131, Iron Fire Dogs, Nos. 10 and 11	50
131, Figured Enameled Fire Dogs, No. 12	60
132 to 135, Brass Andirons and Fenders	50
136, 137, Shovel and Tongs Stands. (See Appendix, folios 34 and 35)	60
138, Blower Stands	60&10
139 to 144, Shovels and Tongs	50
145, Iron and Brass Head Pokers	60
146, Coal Shovels	45
147, Coal Tongs	50&5
147, Toy Sad Irons and Stands	50
148, Sad Iron Stands	55
148, Coffee Pot Stands	65&10
149, Stove Cover Lifters	55
149, Paste Jaggers	60
150, Family Grindstones	50
150, Butchers' Cleavers	45
150, Nut Cracks	60
151, Match Safes	60
151, Twine Boxes	40
152, Boot Jacks	60
153 to 171, Carriage Bands, Sockets, &c. See Appendix for Reduced Lists and Discounts.	

APPENDIX No. 1.

Page.	Dis. per cent.
1, Bronze Metal Barrel Bolts	60&10
1, " " Square Bolts	60&10
2, " " Chain Bolts	60&10
3, Cupboard Bolts	60&10
4, 5, Cupboard Catches	60
6, 7, French Window Catches	60&10
8, Imitation French Window and Cupboard Catches	60
8, Bronze Metal Closet Catches	55
9, Figured Enameled Cupboard Latches	60&10
10, Cupboard Turns	60
11, Drawer Pulls	60
12, Sash Lifts	60
12, Sash Lock and Lift	50
14, Shutter Bars, Nos. 25 and 025	55
13, Sash Fasteners, Nos. 70 and 070	65&10
14, Sash Fasteners, No. 100	50
14, " " Nos. 125, 130 and 0125	60&10
15, Shutter Knobs	60
15, Door Buttons	33⅓
16 to 19, All Articles named on these pages	50
20, 21, Bronze Metal Oblique Store Door Handles	60&10
22, Bronze Metal Oblique Door Pulls	60
23, Shelf Brackets	55
24 to 27, Hat and Coat Hooks	60&10
28 to 32, Connell's Patent Door Bells, Add No. 310¼, 3½ in. Brass Bell, Bronze Metal Latch, per doz., $32	50
No. 320½, 5 in. Brass Bell, Bronze Metal Latch, per doz., $42	50
33, Bird Cage Hooks, No. 3	70
33, Hanging Basket Hooks, No. 15	65
34, 35, Shovel and Tongs Stands	60
36, Hunters' Hatchets, No. 1	50
36, Frame Pulleys, No. 00	60
36, Carpet Hammers, No. 5	50
37, Beef Pounders, No. 1	50
37, Iron Head Ice Picks	33⅓
37, Nickel Plated Cheese and Butter Tryers	50
38 to 44, Carriage Bands, Silver and Close Plated	50&5
Carriage Bands, Finished Brass (Silver Plated List)	50, 10&5
Carriage Bands, Solid Oroide (Silver Plated List)	50&5
Carriage Bands, Nickel Plated (Silver Plated List)	45&5
Carriage Bands, Gold Plated (Silver Plated List)	25&5
45, Carriage Bands, Iron Rim	25&5
45, Carriage Bands, Iron Bell	20&5
46 to 52, Shaft, Whiffletree, Neck Yoke and Pole Sockets	50&5
46 to 52, Finished Brass Shaft, Whiffletree, Neck Yoke and Pole Sockets (Silver Plated List)	50, 10&5
53, Carriage Knobs	60&10
54 to 57, All Articles on these pages	50&10
58, Tackle or Awning Pulleys	60

They also announce the following changes in the prices of goods not made by them, from those quoted in their discount sheet of July 15th :

Page.	Dis. per cent.
172 to 174, Chisels and Gouges	45&10
176, Ives' Cast Steel Cut Augers	30&10
176, " " Auger Bits	30&10
206 to 209, Rules, Boxwood	66⅔&10
217 to 219, Plumbs and Levels	66⅔&10
245, Saw Rods	10&10
263, Blacksmiths' Tongs	33⅓&10
273, Hand and Bench Vises, change list	net
Per doz	$7·31 7·30 7·20 7·30 8·75 10·50 12·00
No. 671	3 3½ 4 4½ 5 5½ 6 in.
275, Carpet Stretchers	40&5
276, Tobacco Cutters, No. 1	33⅓
276, " " No. 2	35&10
304, Cotton Cards	10&10
304, Wool and Jim Crow Cards	15&10
304, Horse and Curry Cards	30&10
327, Welton's Cattle Leaders	50, 10&5
327, Bull Rings	50, 10&5
329, Wrought Iron Barrel Bolts, all kinds	50, 10&10
333, Wrought Gate Latches, complete	60&20
333, Wagon Bow or Body Staples	70&10
333, Hinge Nails, change list—¾x3⅛ inch, per lb., 48 cents	70&10
333, Horse Hooks, with Rings	60&20
334, Wrought Staples	70&10
334, Wrought Hooks and Staples	70&10
335, Wrought Hasps "	70&10
336, Wrought Bent Hasps and Staples	70&10
336, Wrought Meat Hooks	70&10
337, Wrought Awning Hooks	70&10
338, Gate and Shutter Hooks	70&10
339, Screw Eyes, Screw Hooks, & Cornice Hooks and Eyes	70&10
341, Japanned Iron Screws	33⅓&10
349, Acorn Tip Butts, all kinds	50&10
357, Torrey's Door Springs	50
357, Gray's " Change list, per doz.	$7·50..50
360, Merriman's Blind Fastenings, Reduced list	net
362, Rolled Plate and Raised Hinges	75
362, Rolled Blind Hinges, Small and Large	70
362, Welded Blind Hinges, Large	50&10
364, Wrought Trap Door Rings and Staples	70&10
364, " " " only	70&10
364, Japanned Drops and Pins	33⅓&10
367, Hand Rail Screws, Advance list of Swelled Center, $0·50 gross	33⅓
416, 417, Carriage Bolts. See new list	75&10
421, Pointed Belt Hooks	50&10
422, Sheet Brass, Reduce list, per lb., 14c	10
433, Brass and Copper Wire to No. 25, Reduce list, 16c. per lb	10
423, Brass and Copper Wire Nos. 26 to 38, Reduce list, 10c. per lb	add 10
426, Copper Rivets and Burs	30
426, Black and Tinned Iron Rivets	30
435, Halter Chains	gold, 15
453, Coil Chains	gold, 15
439, Japanned Coal Hods	55
439, Galvanized "	45
439, Japanned Funnel Coal Hods	50
439, Galvanized "	40
450, Enameled or Tinned Glue Pots	30
451, " Kettles	30
452, Sauce Pans	25
452, Fry Pans	30
468, Messenger Can Openers	10
470, Fluting Machines, Peerless, change list, 5 in., each, $4·75	net
470, Fluting Machines, Knox	13⅓
476, Britannia Dippers, per dozen, $7·50 (by the bbl. 33⅓ off)	30
477, Mann's Patent Sieves (in lots of 6 doz. 30 off)	25
481, Blake's Traps, change list	25
Per dozen	$2·40 2·87 10·00

made on the 26th ult. by the Western Association. All advices from Pittsburg report the meeting to have been largely attended by Western mill men, and their determined feeling to sustain the advance has given new courage to mill men east of the mountains. Eastern mills continue to quote 3 cts. net as their base price.

Rails.—We note the sale of 5000 tons American at a private price. We hear of nothing in Foreign. The difficulty is the scarcity of cash buyers. We quote, for cash, American, $55, at works; and Welsh, $48 @ $50, gold.

Old Rails.—In Old Rails we note sale of 400 tons Ts at $34, and 500 tons Bridge on private terms. 2500 tons have been sold at $28 in Chicago, and lots are offered now at $29. Holders here are asking $35. We quote them $34 @ $35.

Scrap.—There is a good stock in this city, with little or no demand. The latest sale we hear of was made several days ago—300 tons, from yard, at $36. We quote, $35 @ $37.

METALS.

Copper.—Toward the close of Wednesday, last week, it transpired that upward of 1,000,000 pounds of bankers' Copper had been purchased for export at 19½c., and that there were unfilled orders for more, all of which, on the ensuing day, had the effect of advancing holders' views to 20½c., at which enhanced rate a few parcels were taken by both dealers and consumers. Close upon the heels of these transactions there furthermore followed the purchase of about 3,000,000 pounds, partly at 21c. Of this latter quantity 2,500,000 pounds again emanated from bankers' hands, while the balance was bought from one of the Lake companies at 21c. The foregoing large business all fell into the latter part of last week. During the present week, up to this writing, sales sum up 1,000,000 pounds at between 21c. and 21½c., taken by dealers, consumers and some few speculators. It is not an easy matter to work the views of manufacturers up to 21½c., the present asking price of dealers; it had been difficult to do so, when the price was 20½c., and their hesitation caused the majority to miss the chance. The mining companies are out of the market at anything below 22c. for future delivery, and are offering none on the spot. They have sold so low, when they were sellers, in order to relieve the market of its surplus, and they now mean to derive the full benefit, which they perceive in the altered state of affairs, between the present time and June, 1875. And at first sight their position seems a singularly favorable one; all that remains unsold in the hands of bankers is the comparatively small quantity of 300,000 to 500,000 pounds, entangled in a Tin transaction of the late speculating concern, toward which the Copper went as a margin, and will not be let loose except at a high price, thus virtually being out of the market. The September export lots, bought in August, will now come up for shipment to Europe. Aside from the companies, we have now the leading dealers firm, holding 3,000,000 pounds, and insisting upon 21½c., and as the bulk of available Copper has thus got into financially strong hands, the opportunity to buy cheap seems to have escaped manufacturers for some time to come, all the more to be regretted as they have bought little or nothing ahead. It is true they are fairly stocked with spot Copper for their immediate requirements, but as business improves they will be compelled to go on buying. They have sold considerably ahead of manufactured articles, having their hands full of orders, and against these sales have no Copper in their possession. Everything, in fact, seems to combine to lend unusual strength to the Copper position, but for the danger of a large portion of the exported and yet to be exported Copper returning from Europe the moment we reach a certain point. Great efforts had been lately made at London to depress the general Copper market, but the letters dated 23d ultimo, to hand to-day, show that at that date a vigorous turn was inaugurated. Chili Bars stood £75. 10/, with three buyers to one seller, and a week later the cable tells us they had recovered to £77. 10/, while Best Selected stood £86. Yesterday Chili Bars already commanded £78 at London. Manufactures of Copper, of course, also wear a healthier look in our own market, but we leave them unaltered for the present and repeat the previous quotations: New Sheathing, 30c. @ 31c.; Bolts and Braziers, 32c. @ 33c.; Bronze and Yellow Metal, 22c. @ 23c.; and Yellow Metal Bolts, 30c., net cash.

Tin.—While in this market we are as dull as ever, with hardly anything doing, either on the spot or to arrive, Europe has been steadily recovering. We quote Straits 22c. @ 22½c., gold, offered at 22c., gold, to arrive; L. and F., 20¾c. @ 21c.; English Refined, 21¼c. @ 21½c.; and Banca, 25c, @ 25½c., all gold. "SINGAPORE Aug. 31 telegraphs.—Market quiet with a downward tendency at $24·50 per picul, Malacca Tin." "LONDON, Aug. 31.—Tin steady at £91 for Straits; demand moderate." "September 1.—Straits Tin, £93; L. and F., £96. 10/." The following passage from a London report, dated 22d ultimo, will prove of interest in conjunction with these telegrams: "Straits Tin is quoted about £94. 10/, cash; Banca, £99. 10/; and Australian, £93 per ton. The Cornish smelters have advanced the standards of Tin £2 all round. Superior English now stands at about £99, and for fine £100. Holders are beginning to anticipate improved prices. To-day Straits Tin very flat; offered at £93. 10/, no buyer; Banca, £99 @ £100." In Tin Plates none but a retail trade has been transacted during the week, and we have but to repeat quotations, which remain the following: I. C. Charcoal, $9·87½ @ $10·50, gold, per box; I. C. Coke, $7·87½ @ $8; Coke Terne, $6·75 @ $7; and Charcoal Terne, $7·75 @ $8, all gold. The following is the London report of August 22d:

"Almost all the works in South Wales are once more actively employed, but up to the present time there is no improvement to report in the demand, and manufacturers are very wisely limiting their output.

Lead.—The government sells moderate quantities, and some Domestic has also sold in a small way, the total thus disposed of summing up something like 400 tons for the week, to which there have to be added 100 tons Foreign at 6⅝c. @ 6·40c., gold. The government sales, as heretofore, went at 5·65c., gold, and the Domestic at 5·70c., gold. Spanish Lead is now held at 6⅝c., gold. The drawback is quite an inducement to pay the rates current for Foreign, being $1·80, gold, per 100 pounds to the exporting manufacturer. Of domestic bullion the bulk has of late been retained by the Western smelters, and an active competition for it has prevailed in the Western mining regions, but it is hoped that soon the supply will become ampler, and that with cheaper bullion our Lead Pipe manufacturers will be able to produce an article at rates reasonable enough to more vigorously compete with Iron Pipe, wherever the substitution of the former for the latter may, from an economical point of view, or for other reasons, appear desirable. The European market is quiet and steady at £21. 5/ for good Soft English Pig at London. The manufactures of Lead are quiet at 7¾c., less 10 per cent. for Bar, Sheet and Pipe, and 16½c., less 10 per cent, for Tin Lined Pipe.

Spelter and Zinc.—This metal continues strong on the Continent of Europe, and the limits have been raised ½c., gold, per telegraph, for good brands Silesian. At the same time, independently therefrom, there came dispatches from Germany that the alarming spell of drought there continues, which cannot have failed to directly influence the Spelter market at the leading centers. We have alluded to the enhanced rates of Spelter freights in Germany, by reason of the low state of the rivers, some time ago. As long as the latter are navigable with ease, Spelter is shipped in larger quantities, but when they get to be low more expensive conveyance has to be resorted to. Hence, we presume that the improvement is in a great measure due to this circumstance; although the telegrams do not explain. However this may be, Domestic Spelter cannot fail to be favorably influenced, if the Foreign markets retains its strength, and a little more animation be superadded here. We quote, with a moderate business transacting, Foreign 6·70c. @ 6·87½c., gold, and Domestic 6⅝c. @ 6¾c., currency, with sales of the latter at 6⅝c., currency. The market closes steady. Zinc plates are quiet at 8¼c. @ 8½c., gold.

Antimony—Sells in a retail way at 11½c., gold.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending September 1, 1874:

Hardware.

Alexander & Barton, Cutlery, cs., 1
Anderson, Merchant & Co. Files, cks., 24
Austin, Baldwin & Co. Rifles, cs., 5
Beam & Murray, Cases, 1
Boker Hermann & Co. Mdse. pkgs., 37
Bush R. S. & Co. Wire rope, bdls., 118
Drexel, Morgan & Co. Files, cks., 2 Cases, 1
Field A. & Co. Mdse. pkgs., 5
Fuller Bros. Cutlery, cks., 3
Hayden & Tompkins, Casks, 2
Hoadley, Eno & Co. Boxes, 1
Harmar Wm. & Co. Mdse. pkgs., 5
Jackson R. D. Arms, cs., 14
King, Briggs & Co. Casks, 1
Lau & Garliche, Guns, cs., 1 Mdse. pkgs., 1
Moore's J. P. Sons, Mdse. pkgs., 7
Mason John W. & Co. Wire, rope, coils, 3
Squires Lewis L. & Sons, Wire, rope, coils, 10
Squires H. C. Guns, cs., 1
Spies, Kissam & Co. Cases, 2 Guns, cs., 4
Tillotson L. G. & Co. Wire, lots, 402
Van Wart & McCoy, Nails, bags, 3 Bolts, cs., 1 Cases, 3
Wiebusch F. Anvils, 186
Order. Wire, bdls., 972

Iron.

Congreve Chas. & Son, Rails, 804
Johnston, J. Boorman & Co. Pig, tons, 200
Lang W. Bailey & Co. Plates, 38
Morton, Bliss & Co. Rails, 676
Naylor, Benzon & Co. Bars, 282 Fish plates, bdls., 770
Naylor & Co. Fish plates, bdls., 367
Randolph L. V. F. Rails, 1506
Seligman J. & W. Spiegel, lots, 1
Order. Bars, 3703 Fish plates, bdls., 202 Rails, 571; pcs., 260 Scrap, rails, 1879

Steel.

Brown Wm. Bundles, 50 Cases, 16
Drexel, Morgan & Co. Bars, 1183
Naylor & Co. Rails, Bessemer, 681
Prosser Thos. & Son, Bars, 20
Van Wart & McCoy, Bundles, 2
Order. Spring, tons, 50 Scrap, spring, tons, 34 Scrap, tons, 10¼ Rails, 3704 Bundles, 758 Cases, 8 Bars, 50

Metals.

Bruce & Cook, Tin plates, bxs., 201
Byrne Joseph & Co. Tin plates, bxs., 500
Naylor & Co. Tin plates, bxs., 2238
Phelps, Dodge & Co. Tin plates, bxs., 6567 Tin, slabs, 94
Order. Lead, pigs, 2590 Tin plates, bxs., 8502 Tin, slabs, 28 Zinc, bbls., 25 Spelter, plates, 4030

OLD METALS, PAPER STOCK, &c.

Business in this market still continues dull, and we have nothing new to note in the way of changes in our market quotations. There has been a better demand for Hemp Rope this week than for some time past, as the various paper mills have been purchasing the entire accumulations of dealers at the regular market prices. We quote the following as the current purchasing rates:

Old Metals.—Copper, 15c. @ 16c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 4c.; Zinc, 4½c. @ 5c.; Pewter, No. 1, 19c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5½c., Wrought Iron, 1¼c.; Sheet do., ½c.; Cast, do., ½c. @ ⅝c.; Machinery, do., ⅝c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No. 1, 6c. @ 6¼c.; No. 2, 2½c.; White, No. 1, 6¼c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 4½c. @ 5c.; Gunny Bagging, 1c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 3c.

COAL.

There is a better feeling existing in the Coal market at present than has been noticed for some time past. Consumers are buying more freely, and Anthracite has been in moderate request. The Coal trade always quickens more or less in the fall, and there will be no exception this year. The monthly circulars, which are issued on the first of every month, according to the associated companies' programme, announced at the beginning of the year, have advanced prices 15 cents per ton. The Scranton sale, which took place on the 26th ult., has also resulted in a general increase. We quote Anthracite, by the cargo, at $5·25 @ $6·30. The circular of Messrs. Meeker & Dean, offices 16 and 18, Trinity Building, 111 Broadway, quotes as follows for Coal delivered on board vessels at Hoboken, N. J., for September:

	Lump.	Steamer.	Broken.	Egg.	Stove.	Chestnut.
	$	$	$	$	$	$
Kingston	5·25	5·35	5·45	5·60	6·10	5·05
Wyoming Red Ash	....	....	5·45	5·70	6·25	5·05
Sterling Lehigh	6·20	....	6·15	6·15	6·30	5·35
Cross Creek Lehigh	5·80	5·80	6·10	6·10	6·30	5·35
Wilkesbarre	5·25	5·35	5·45	5·60	6·10	5·05

The market for Bituminous Coal is very quiet, and prices remain unchanged. The boatmen employed on the Cheaspeake and Ohio Canal have struck for an advance in freights, which the various companies have refused to comply with. The boatmen are determined to hold out, however, and so the matter stands.

We quote as follows: Cumberland, $6·75 @ $7; West Virginia, $7·40 @ $7·50; Pennsylvania, and Westmoreland, $7 @ $7·25; James River Steam, $6·25 @ $6·50; American Cannel, $12 @ $12·50.

The market for Foreign has been very dull, and the arrivals are small. The quotations are: Liverpool House Cannel, $17 @ $18; Liverpool Gas, $11; Newcastle Gas, $7 @ $10; Scotch, $7·50 @ $8.

PITTSBURGH.

PITTSBURGH, Aug. 31, 1874.

PIG IRON.—Trade has been more active this week, the volume of business being much larger than during any preceding week for a couple of months, and, furthermore, quite a number of the sales of forge iron reported show a decline of half a dollar per ton. As your correspondent intimated in his last report, the stagnation which prevailed so long could not help but have a depressing effect on the market, hence it is not surprising that slight concessions were made in order to effect sales; however, the most, if not all, of these purchases were on spot, for immediate delivery, producers refused to contract ahead at current rates. Since the meeting of the mill men, however, there is a better feeling, and as the manufacturers have advanced rates for the product, producers expect an increased demand for the raw article, and in the course of a few weeks, once the fall trade fairly sets in, they expect to be able to obtain an advance in prices of $2 to $3 per ton, which would yield a small margin for profit. The production, both here and in the Mahoning and Shenango valleys, continues light; a large percentage of the furnaces are out of blast, and unless there is a very decided advance in prices, which is not expected, very few if any of them will start up again before next spring, if then. This being the case, the feeling is generally entertained that pig is good property at current rates; that an advance is only a question of a little time; yet some of our manufacturers are very distrustful of the future, and the probability is that they will continue to adhere to the hand-to-mouth policy, and buy only for immediate wants. The receipts from all sources have fallen off considerably within the past few weeks, and the great proportion of that coming forward is being placed on contracts, but very little of it going into yard, so that the stock on the market for sale is not being increased much, although nearly all the yards of the commission men are pretty well filled. Some of the mills have fair supplies, having bought pretty freely in June and the early part of July, but the majority of them are differently situated, and their policy, as already intimated, is to buy only for immediate wants—to carry no more stock than is absolutely necessary.

QUOTATIONS.

No. 1 Foundry	$29·00 @ 30·00—4 mos.
No. 2 Foundry	27·00 @ 28·00—4 mos
Gray Forge	26·00 @ 27·00—4 mos.
White and Mottled	24·00 @ 25·00—4 mos.
Hot Blast Charcoal	30·00 @ 35·00—4 mos.
Cold Blast Charcoal	45·00 @ 50·00—4 mos.
Blooms, as per quality	80·00 @ 90·00—4 mos.

MANUFACTURED IRON.—The most important matter to be noticed is the meeting of manufacturers, which took place in this city on Wednesday last. It was largely attended, and was, perhaps, one of the most important meetings of the kind that ever convened together, as it was represented, either in person or by letter, by nearly all the manufacturing points in the country, and all being strongly impressed with the necessity of a conference in order to ascertain, as fully as possible, the exact situation, present as well as prospective, and agreed to stand by its action. It was soon developed that there was no necessity for keeping prices down below actual cost of manufacture, and a three cent card was unanimously agreed upon, an advance of four to five-tenths of a cent per lb., as compared with what it was. This places the actual selling rate for merchant bars at two cents and eight tenths, sixty days, with two per cent. off for cash. It was developed at the meeting that all the Pittsburgh mills, with one or two exceptions, are running, some of them double turn, and our manufacturers do not entertain any apprehension but what they will have about all they can do during the the balance of the year. The fact is there has been no reason to complain, so far as orders were concerned, at any time this year; the great source of complaint was in regard to prices, which were down so low that they yielded no margin for profit, and lower than there was any necessity for. The following mills were represented at the convention: Brown & Co.; Graff, Bennett & Co.; Brown, Bonnell & Co; Everson, Macrum & Co.; Cartwright, McCurdy & Co.; Wm. Clark & Co.; Greenville Iron Co.; Westerman Iron Co.; Erie Rolling Mill Co.; Kimberly, Carnes & Co.; Reis, Brown & Berger; Ohio City Iron Works; Carnegie, Kloman & Co.; Byers, McCullough & Co.; Cleveland Iron Co.; Lindsay & McCutcheon; Lawrence Iron Works; Mitchell, Tranter & Co.; Swift Iron & Steel Co.; Gaylord Rolling Mill Co.; Niles Iron Co.; Youngstown Rolling Mill Co.; Pittsburgh Forge Co.; Glass, Neeley & Co.; Terre Haute Iron Works; Moorhead & Co.; Lewis, Oliver & Phillips; Wm. Richards & Son; Wyandotte Rolling Mill Co.; Henry Lloyd, Son & Co.; Zug & Co.; Spang, Chalfant & Co.; J. Painter & Sons; W. D. Wood & Co.; Jones & Laughlins; Lewis, Bailey, Dalzell & Co., and the Ohio Iron Co.

NAILS.—The Nail trade continues in a very unsettled and unsatisfactory condition. There is a very fair demand, and it is increasing. The best evidence that business is enlarging lies in the fact that the factories here are, so far as I can learn, all in operation, but prices are kept down to a point that affords no margin for profit. The Wheeling factories, it would appear, have been accepting almost any price they could obtain recently, and they, in consequence, are mainly responsible for the unsatisfactory and demoralized condition of the market. The Nail men also had a meeting on last Wednesday, but as a large number were in attendance at the Iron meeting, being interested in both branches, it was deemed best to adjourn until Thursday, the 3d day of September. It is difficult, of course, to foretell the action of this meeting, but there is not much doubt but what prices will be advanced. It is said that some of those who have been selling the cheap Nail, recently, are now ready for advance, having discovered probably that the more business they done at the prices the poorer they were becoming. Pittsburgh manufacturers have been refusing to sell below $3·40, 60 days, and they are indifferent about orders at quoted prices.

SCRAP IRON.—The market continues very dull, but hopes are entertained that there will soon be a change for the better. Prices are nominally unchanged.

STEEL.—Trade continues fairly active. All the mills appear to be busy, but it is complained that there is considerable "cutting" under the card, and that prices, in consequence, are lower than they ought to be, and than there is any necessity for.

NO MORE SUSPENSIONS OR FAILURES.—There have been no additional suspensions, and, furthermore, there are no rumors of any. The suspension of McKnight, Porter & Co. and McKnight, Duncan & Co. created, as might be expected, quite a sensation, as it was, by the general public, entirely unexpected. It is expected, however, that the firms in question will have no difficulty in obtaining an extension. Our manufacturers, as a general thing, are in good condition financially, and are pursuing a very conservative policy.

The Pittsburgh *Commercial* of August 30 says: From reports below it will be seen that the sales of Pig Metal the past week are considerably in excess of any week for some time—which may be accounted for in several ways. The extreme dullness which has prevailed for several weeks has had the effect to induce parties to accept orders at a shade off former rates, which, added to the fact that most of the rolling mills expect to start double turn next week, or week after, has produced a little more demand. The Convention of Manufacturers which met in this city on Wednesday, and brought together representatives from more than forty establishments, may have had some effect to increase the sales, especially as it was generally conceded that the prices at which sales of Manufactured Iron and Nails have been selling for several months past were below the cost of production, and that some combined effort must be made to secure more satisfactory prices. At this convention it was resolved to advance the actual selling price of Iron without making any material alteration in the card price, and the convention adjourned to meet in a few weeks. It is expected that this meeting will have the effect to make the market firmer, but it is not at all certain; therefore, the mill owners are slow to buy Pig Iron, as they claim that even at 2 8-10c., net, for Bars, they cannot afford to pay more than $26·50 for Pig. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

700 tons gray forge	$26·50—4 mos.
500 tons gray forge	26·50—4 mos.
300 tons gray forge	26·50—4 mos.
300 tons gray forge	26·50—4 mos.
250 tons gray forge	26·50—4 mos.
250 tons gray forge	26·50—4 mos.
150 tons white and mottled	25·00—4 mos.
200 tons gray forge	26·50—4 mos.
150 tons cold short, Western	25·00—4 mos.
100 tons gray forge	26·50—4 mos.
100 tons gray forge	26·50—4 mos.
100 tons gray forge	27·00—4 mos.
100 tons gray forge	27·00—4 mos.
100 tons white and mottled	24·50—4 mos.
100 tons No. 2 foundry	27·00—4 mos.
50 tons gray forge	27·00—5 mos.
50 tons mill	27·00—4 mos.
40 tons gray forge	27·00—4 mos.
20 tons cold short, Eastern	27·00—4 mos.
10 tons No. 1 foundry	29·50—4 mos.

ANTHRACITE.

100 tons gray forge	$27·00—4 mos.
100 tons gray forge	27·00—5 mos.
20 tons No. 2 foundry, R. S. at fur.	27·00—cash.

CONNELLSVILLE COKE.

20 tons No. 1 foundry	30·00—4 mos.
10 tons No. 2 foundry	28·00—4 mos.
10 tons No. 1 foundry	29·00—4 mos.
10 tons No. 2 foundry	27·50—4 mos.

CHARCOAL, HANGING ROCK.

60 tons No. 1 foundry	$36·00 @ $37·00—4 mos.
30 tons No. 1 foundry	36·00—4 mos.

ALLEGHENY COKE.

200 tons gray forge, October delivery	private terms

CLEVELAND.

Messrs. READ & DICKEY, Iron Brokers, under date of August 31, write us as follows:

PIG IRON.—The market remains in comparatively the same state as at date of our last report. There has been some little inquiry for Bessemer metal, consequent upon a demand for Rails, although in so limited a way as to cause no change whatever in quotations. Black Band Foundries continue in fair demand. Gray Forge alone, of all grades, is in good demand at well maintained rates. Quotations are:

CHARCOAL PIG IRON FROM L. S. ORE.

Nos. 1 and 2 Foundry	$35·00—4 m.
Nos. 3 and 4 Car Wheel	37·00—4 m.
Nos. 5 and 6	39·00—4 m.
Bessemer Metal, Charcoal	33·00—4 m.
Bessemer Metal, Bituminous	29·00—4 m.

BITUMINOUS PIG IRON FROM L. S. ORE.

No. 1 Foundry	$29·00—4 m.
No. 2 Foundry	27·00—4 m.
No. 1 Gray Forge Red Short	28·00—4 m.
No. 2 Gray Forge Neutral	27·00—4 m.
White and Mottled	25·00—4 m.

PIG IRON FROM BLACK BAND ORES.

Massillon No. 1	$33·00—4 m.
Massillon No. 2	31·00—4 m.
"New Gartsherrie" No. 2	33·00—4 m.
Muck Bar	$41·50 @ 45·50—60 days.

MANUFACTURED IRON.—The demand continues good at *old* prices, but whether the recent advance "resolved" upon by manufacturers in Pittsburgh and the valleys will have the effect of bringing out buyers at "resolution" rates, and stimulating the market to greater activity and greater profits, or the reverse, and checking the demand, remains to be seen. That better prices are needed for stockholders and semi-annual dividends is beyond dispute. It is greatly to be hoped that the meeting of manufacturers, which we learn developed a very firm and unanimous spirit in favor of putting prices up, and no deviation therefrom, will be the means of bringing about an advance, to that point, at least, that the prices will be remunerative to manufacturers, and still be cheap to consumers. To-day, being the last day of the summer months, ends the payment of the "hot dollar" paid extra to puddlers, which, added to the recent advance of about two dollars per ton, from 2 5-10 to 2 6-10 per lb., or say three dollars per net ton in favor of mills for September above prices current the first of July, added to the advance agreed upon in Pittsburgh of some four dollars more, must either make the manufacture of Bar Iron satisfactorily profitable now or *more* ruinously disastrous in the spring and early summer than most makers care to acknowledge. Still we have seen several statements from Pittsburgh correspondents, and in the dailies of the "Iron City," that they turned out more *Bar Iron* during the first six months of 1874 than at any previous six months. If it takes seven dollars per ton advance to make the business pay a profit in Pittsburgh, where it is claimed Iron can be made more cheaply than elsewhere in the States now competing for the home consumption, we should think the less made at old prices the better, and only wonder that there has been so few failures and extensions. We have had the pleasure of hearing of a mill in our vicinity that has recently declared a quarterly dividend of three per cent., which, in these dull and monotonous times of money losing, is truly refreshing.

SHEET IRON.—In good demand at firm prices.

NAILS.—We hear that there is soon to be a meeting of manufacturers, and that prices will be advanced. There is little doubt but that many have been losing money at prices current of late.

Prices from store here are advanced.

	60 days.
Bar, Band and Hoop Iron	$2·90
Sheet Iron, No. 24	4·70
Nails, 10d. to 60d	3·60
Ship Spikes, ⅜ and larger	4·20

CINCINNATI.

Messrs. ADDY, HULL & CO., under date of August 31, write us as follows: The market remains substantially as last reported. The demand continues very light for all grades. No change in prices of Hot Blast Iron. Cold Blast Car Wheel brands are still neglected, and quotations must be considered nominal.

HOT BLAST CHARCOAL.

Hanging Rock	No. 1	$33·00 @ 34·00—4 mos.
" "	No. 2	30·00 @ 32·00—4 mos.
" "	Forge	27·00 @ 29·00—4 mos.
Tennessee	No. 1	32·00 @ 33·00—4 mos.
"	Forge	27·00 @ 29·00—4 mos.
Alabama	No. 1	31·00 @ 32·00—4 mos.
Missouri	No. 1	33·00 @ 34·00—4 mos.
"	No. 2	30·00 @ 32·00—4 mos.

HOT BLAST STONE COAL.

Missouri	No. 1	$32·00 @ 33·00—4 mos.
"	Forge	27·00 @ 29·00—4 mos.
Ohio	No. 1	30·00 @ 31·00—4 mos.
"	Forge	27·00 @ 28·00—4 mos.
Scotch Pig, No. 1		

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel		$50·00 @ 55·00—4 mos.
Missouri	" "	48·00 @ 52·00—4 mos.
Kentucky	" "	50·00 @ 55·00—4 mos.
Tennessee	" "	48·00 @ 52·00—4 mos.
Georgia	" "	48·00 @ 52·00—4 mos.
Alabama	" "	48·00 @ 52·00—4 mos.
Machinery and Forge		45·00 @ 48·00—4 mos
Blooms		90·00 @ 95·00—4 mos.

LOUISVILLE.

Mr. GEO. H. HULL, under date of Aug. 31, writes us as follows: Hot Blast Iron continues firm in price, with a moderate demand. Cold Blast Irons are dull, with small rates. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$33·00 @ 34·00
" 2 " " " "	29·00 @ 30·00
" 1 Forge, " " "	27·00 @ 28·00
" 1 F'dry, from Tennessee Ores	32·00 @ 33·00
" 2 " " "	28·00 @ 29·00
" 1 Forge, " "	26·00 @ 28·00
" 1 F'dry, from Alabama Ores	30·00 @ 32·00
" 1 " " Iron Mountain Ores	32·00 @ 34·00

HOT BLAST STONE COAL.

No. 1 F dry, from Missouri Ores	33·00 @ 34·00
" 2 " " " "	30·00 @ 31·00
" 1 Forge, " " "	29·00 @ 30·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	50·00 @ 54·00
" " Tennessee Ores	46·00 @ 48·00
" " Alabama Ores	48·00 @ 50·00
" " Georgia Ores	48·00 @ 50·00
" " Missouri Ores	45·00 @ 48·00
" " Kentucky	48·00 @ 50·00

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Sept. 1: We have to report a slightly improving market, with a stiffening in prices of, say, 1-10c. per pound on Bars, Bands, Hoop, &c., based on action of meeting held last week in Pittsburgh. The list otherwise remains unchanged.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ¾ to 1 thick; 1 to 4¾ wide by 1¼ to 2 thick	2·9 to 3·1 cts. per lb.
Round and square, ordinary sizes, from ¾ to 2 inclusive	2 9-10 to 3 1-10c. "
Hoop Iron, 1¼ wide and upward	4¾ to 5c. "
Band Iron, from 1¾ to 4 in. wide	4 to 4½c. "
Horse Shoe Iron ¾ to 1 wide by ¼ to ⅜ thick	4¾ to 5c. "
Norway Nail Rods	7¾ to 8¼c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16½c. "
Machinery Steel	11½c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	13c. "
Perkins' Horse Shoes, per keg of 100 lbs	$5·87½
" Mule Shoes " "	6·00

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per D.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per D.

R. R. Spikes ⅝ by 9-16 at 3¼c to 4c. per lb.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, Aug. 16, 1874.—*Metals.*—Notwithstanding the heavy charters on the West Coast for the month of July, *Copper* has recovered a little of its former strength, and the weakness of last week has made room for a certain degree of firmness. The raising of the discount by the Bank of England would, under ordinary circumstances, rather have checked buoyancy in the metal markets of Europe, whereas, on this occasion, it has had no effect whatever. The fact is that the discount was raised merely to stem the tide of exchange, which threatened to drain the Bank of England, and transfer still larger amounts of specie and bullion from London to this city. There is no crisis at hand, either financial or monetary; there is an abundance of ready money, and as there are bountiful harvests everywhere, the outlook is as reassuring as possibly could be the case, augurring favorably for the metal trade in particular, at all times the quickest to be swayed by influences of a similar nature. In the present instance the state of transition from apathy to animation is expected to be shortened by the circumstance that the previous

spell of paralyzation has been such a long one, and that it precluded all overtrading. There is now little if any speculation in the metal business. As regards Copper in particular, it should, however, be remarked that for some time past the trade with the East Indies, important as it used to be, has been gradually abating; it is, nevertheless, fair to presume that at any given moment it may revive. Copper being cheap, it is more than likely that it will henceforward be more extensively used in combination with other metals, or in substitution therefor. The Copper market here has been steady and unchanged, on the basis of 205 francs, Chili Bars. Nothing has transpired at Havre. At Marseilles the market has been rather weak, but the quotations there are nominally unchanged. *Tin.*—The increased strength exhibited by this metal has been due to the consumptive inquiry that has sprung up in the various European markets, and particularly so in Holland, where it has been fairly active during and subsequent to the sale, leading to an important improvement in value. Should the Tin Plate Manufacture in England revive, which we suppose is near at hand, another element of strength will be added. Yet it should not be overlooked that the uncertainties of Australian production will continue to operate as a restraint upon any important improvement in the value of Tin. That country being at such a distance from Europe, and the mines exclusively under the control of London capitalists, we hear no more of the state of production in progress than suits the purposes of a few men; all we see are the statistics of import, and from them we perceive that the amount sent to England has been and is rapidly on the increase. Our own market has been but indifferently well supported, and we cannot quote Banca above 258 francs. Marseilles is weak, too, at 250 for Straits. *Lead.*—The firmness in Lead, which has now lasted for a month or two, has remained unwavering, and the slight giving way that seemed impending a week ago has left no trace behind. We are telegraphed from all quarters that the metal remains steady. Holders, generally, in Europe seem disinclined to sell ahead beyond small quantities. It is pretty much the only metal that is really firm here at present at 53·50 francs the 107 kilos. More business would have been transacted at Marseilles but for the scanty arrivals, and the market there remains firm. In Russia the metal had relapsed into quietude, but evinces more animation now on the basis of 26 to 26¼ roubles the 164 kilos. *Spelter.*—This metal, although steady on the whole, has been rather inactive in the European markets; no change can be noted here, we are firm at 57 francs, Silesian, deliverable at Havre. Marseilles, also, unaltered. *Iron.*—France is about the only country in Europe at the present moment where Iron industry is in a comparatively flourishing condition, and where the future is viewed with well founded confidence in the branch. The rolling mills very nearly throughout the country have an abundance of work on hand, and the foundries are also well off, but there is no improvement in prices. *Coal* has not been overactive; the decline in Westphalia and in the London market has checked operations. Should there be any indications of another strike in the English Coal regions, the whole aspect would undergo a speedy transformation. Common Coal for manufacturing purposes varies between 20 and 24 francs at the North, in the Pas de Calais, and in the Loire district; Stove Coal commands from 32 to 34.

BELGIUM.

(Le Commerce.)

BRUSSELS, Aug. 15, 1874.—*Iron.*—There has been rather a dull state of affairs in Iron matters in Belgium. At the late opening of tenders for Rails, at Luxembourg, the average between the Couillet, Acos and Selessin works proved to be 225·60 francs, which established the current market price. At another opening of tenders for the building of the iron bridge across the Sambre, at Franiere, there was a difference of but 46 francs between the two lowest bidders, a Belgian company carrying off the award at 127,899 francs, all told, for the bridge delivered complete. There is sufficient confidence in the immediate future, and the royal concession has been granted a fortnight ago to another large iron company, the "Providence," which will start blast furnaces and rolling mills on an extensive scale in the Marchienne-au-Pont region with 80 coke furnaces and 36 puddling ovens, two trains of rolls driven by two engines of a hundred horse-power each. The iron bridge projected by the Hungarian government in 1871, to cross the Danube at Pesth, across the Island of Marguerite which intervenes between the banks, will be built on arches, instead of being a low one as had been originally designed, and is now to be carried out on this modified plan. *Coal.*—Our companies having resolved not to raise prices, the wisdom of their action in the matter is shown by the steady demand that has been encouraged to come forward since. In the Liege region stocks had run so low, however, that an increase in prices of a franc or two has been readily subscribed to. In any event, prices cannot rise much in Belgium as long as the Ruhr country sells so low, say from 15 to 16 thalers the 100 quintals, a lowering of 2 thalers from recently prevailing rates. What steadiness in the price of Coal there is in Belgium at present is mainly due to two causes: to the general reduction of stocks, by curtailed production, on the one hand, and to the growing scarcity of common coal miners, on the other. According to the official report the Liege Coal mines produced last year 3,674,578 tons, against 3,653,091 in 1872; the excess of 21,484 tons went hand in hand with an increase in the total value of the Coal of twenty-nine million francs by reason of the great rise in the price of the fuel that had intervened. In 1860 the district produced but 1,900,000 tons and remained so till 1864. The production has doubled in ten years, while the value of the Coal turned out had quadrupled. There were employed last year 24,696 miners, an increase of 2388 over 1872.

GERMANY.

(Borsenhalle.)

HAMBURG, Aug. 17, 1874.—*Copper.*—The German markets have been fluctuating during the week, owing to the abnormal condition of the general Copper situation, as it appears for the present. After a while, when we shall be able to form a more precise judgment as to what may be expected from the United States and Chili in the more immediate future, a more sedate feeling may obtain sway once more of our own and remaining markets. At Berlin Australian and English have been keeping between 28 and 28¾ thalers; Stettin is steady at 29 to 32. We are quiet here with a sale of Drontheim at 89 marks. *Tin.*—Although firm, on the whole, the German Tin markets have been rather quiescent; the few dealings have been for immediate consumption merely. At Berlin, Banca does not sell above 33¾ to 34 thalers, while English only commands 32¾ to 33¼. Here we cannot readily get over 1·06 marks for Banca, and 1·05 for English. *Lead*, without leading to transactions of note for the moment, keeps steady and unchanged here, and at the remaining centers. *Spelter* is as firmly supported as heretofore. Good brands Silesian command without difficulty 7¼ to 7¾ thalers the 50 kilos., at Berlin, and at Stettin 7¾ to 8. A sale has been made of 500 quintals on the spot at 21¾ marks.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, Aug. 15, 1874.—*Tin.*—There is a firmer feeling in the market. Banca, spot, was done at 56¾, 58¾ and 58 guilders. Futures from the September sales were sold from 56 all the way up to 57¾, and spot Billiton at 56. Spot Banca, in exchange for September auction delivery, has been paid one guilder difference. P. S.—Aug. 18.—The market is gaining in strength. Banca deliverable from the late sale has been sold at 56¾, and then rose to 58¾, in order to recede for the time being to 57¾ to 58. Deliveries from the coming sale have ranged between 56 and 57¾, in order to close at 57, and spot Billiton has been dealt in at 56. The 8000 picul Billiton sale, which was held at Batavia (Java) on the 10th instant, evinced a fair degree of animation, and averaged 90 34 guilders per picul.

EAST INDIES.

(Clark, Spence & Co.)

POINT DE GALLE, Ceylon, July 20, 1874.—*Plumbago.*—Supplies are undoubtedly falling off, the diggers asserting that present rates do not pay to work the mines, otherwise prices would have declined more than they have done, for there is but little inquiry except for fine bright Lump, which is scarce, and the London market seems to be gradually more and more drooping. As advised in our last, about 10.0 cwts. go forward to London by the steamer Good Hope, and have now been shipped. The export duty, instead of one rupee per ton, as was erroneously stated by us in our circular of April 2, is ten rupees, or be it one pound sterling, per ton. The market closes quiet; freight 60/ per ton. We quote Lump £17 to £18 per ton, free on board, with freight and exchange at par; Chips, £11 to £12, and Dust, £7 to £7. 10/. Exchange, 6 months', London, 1/10¾ to 1/10¾.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., Aug. 17, 1874.

TRADE PROSPECTS

do not appear to brighten up much, whether in regard to the home market, the colonies, America, or the more distant haunts of commerce in the far East, which have of late been among our best customers. So far as Great Britian is concerned we, having good opportunities for accurate observation, think that there are signs of a move upward, and some of us are firmly grounded in the belief that what is confidently expected to be a harvest of a first-class kind, will promote liberality in expenditure among the farmers and the country tradesmen. I can personally testify that when, three weeks ago, I took an extended tour through Lincolnshire, and part of Nottinghamshire, embracing the finest agricultural district in this country, I was then of opinion that the crops on the heavy lands were of a good average character, and not having been laid by storms would probably be secured in a better condition than ordinary. Much of it has since been so got in, and so far as that portion is concerned I expect the yield will be about, but not above, an average. But during the last fortnight or so the weather has been for the most part wet, the showers being often very heavy and protracted, hence a large part of the cereals will have to be gathered in an indifferent or bad state, which will pull down the average of the whole country. Thus I believe—and my observations are the result of a further journey through Lancashire, part of Cheshire, Yorkshire, and the pretty little fertile Isle of Man—that on the whole our harvest will *not* be above the average. On the light lands the crops are thin, and there is so little straw that barley will have to be pulled. There can be no doubt whatever that a good harvest gives a sort of courage to a large class of purchasers, and emboldens them to lay out more money than they otherwise would in implements, clothing, and some of the luxuries of life. A good harvest also causes a disturbance in the money market, owing to the gold which is needed to be distributed in the innumerable channels which are thus opened and "refreshed" once only in the year. Apart from the home market there are the foreign wheat producing countries to be considered, and it is from these that we collate facts and form theories of a consoling nature. Our reports from America, Northern Prussia and Poland and Southern Russia are all very satisfactory indeed—so much so, in fact, that wheat prices are drooping, and we feel, on the whole, well assured as to the abundance and cheapness of our main food supply during the coming twelve or thirteen months. I say twelve or thirteen, because the harvest is this year unusually early, and may next season be as correspondingly late. Thus, then, the harvest reviewers and corn statisticians encourage us, and would lead us to suppose and expect that we may reasonably expect an early revival of all branches of industry—an improvement which must, perforce, communicate itself to the iron, steel and hardware trades. Here in Sheffield our steel and tool manufacturers do earnestly trust that your Western States will succeed in having a fine ingathering of corn, so that they may be able and willing to buy tools and implements on a larger scale than at present. Sheffield, of course, won't make *all* the tools, and it will not provide *all* the steel, but a bite is better than nothing, and in our present dull condition we are more inclined to be omnivorous than to be epicurean in our business tastes and appetite.

THE BRITISH EXPORTS DURING JULY

are of an instructive, even if not very entertaining, nature, the great falling off of the previous month having been still further augmented. The full details of the various articles have not yet reached me, but the position of matters will be gathered from the under given details, the aggregate falling off being £837,623, or 24 per cent., distributed over all departments of the iron trade except wire, which increased 6 per cent. In pig and puddled iron the decline for the month is no less than £323,263, or upward of 50 per cent., due chiefly to Germany, Holland, Belgium, and the United States. In bar, angle, bolt and rod iron, the falling off amounts to £128,026, or about 40 per cent., due chiefly to Germany, Russia, Holland, Italy, Turkey, and the United States, the solitary instance of increase being in the case of Australia. In railroad iron, the decline amounts to £63,070 or 6 per cent., for which Belgium, Egypt, United States, Italy, Russia, Germany, Sweden, and Norway and Holland, are mainly responsible. To Spain, Brazil, Peru, Chili, British North America, India and Australia, our rail exports for the month have increased. In hoops, sheets and plates the decline amounts to £67,391, or 20 per cent., due chiefly to Russia, Germany, Holland, Italy, Australia and the United States. On the other hand, there is an increase under this head in our trade with Spain, British North America and India. In cast or wrought iron the decline is £45,688—say 8 per cent.—attributable chiefly to Russia, Germany, Australia, Holland and France; the chief instances of increase being in the cases of British North America, South Africa and India. For the seven months the total decline in iron and steel amounts to £4,218,867, or 19 per cent.

Iron.	Month of July. 1873.	1874.	Seven Months. 1873.	1874.
Pig and puddled.....£	604,387	£281,124	£4,614,128	£1,942,511
Bar, angle, &c.....	324,618	196,592	2,264,213	1,669,092
Railroad.....	1,017,963	954,894	5,604,841	6,449,658
Wire.....	57,869	61,030	424,999	396,040
Telegraphic ditto.....	197,267	74,702	899,647	1,654,456
Cast and wrought....	525,051	479,363	3,235,171	3,092,784
Hoops, sheets, &c.....	320,433	253,042	2,258,154	1,548,799
Old iron.....	14,065	50,648	288,919	141,137
Steel, unwrought....	139,009	105,460	890,393	676,229

The increase shown below in the month's exports of unwrought copper is due mainly to France. There is a heavy decrease, however, for the seven months, over 30 per cent., for which the United States, France and Holland, are mainly responsible; the principal markets of increase being Germany and India. In wrought copper there is a decrease of nearly 9 per cent. for the month, attributable chiefly to Turkey, Egypt and India; but for the seven months there is an increase under this head of over £24,000, or 4 per cent. In brass the improvement for the month amounts to nearly 50 per cent., and for the half-year to over 80 per cent.

	Month of July. 1873.	1874.	Seven Months. 1873.	1874.
Copper and Brass				
Unwr'ght copper..	£79,537	£100,110	£782,029	£536,697
Wrought, &c.....	87,323	80,351	609,209	633,832
Brass.....	53,561	75,238	249,529	447,342

THE SCOTCH PIG IRON MARKET

has, on the whole, been fairly firm since I last wrote, and on one or two days a large business has been done, mainly for shipment. As several additional furnaces are in blast, and others will shortly be so, it may be presumed that with a more abundant supply prices will become easier, unless, by the merest chance, the demand should suddenly strengthen, in which eventuality quotations may be maintained for a limited period. Under present circumstances, I do not think it at all probable that a rig will be attempted by the ring of speculators. Freights remain unaltered at the figures lately given in my letters. Writing on August 11th, Messrs. Wm. Colvin & Co. (Glasgow) have these remarks:

"The warrant market continued firm on Wednesday and Thursday, and a good business was done up to 90/6. On Friday the tone was not so strong, and the closing price on that day was 88/6. This week there has been rather less doing, the prices ranging betwixt 88/6 and 87/, and closing this afternoon with buyers at 88/3, and sellers at 88/6. There are now some additional furnaces in blast, and more are expected in the course of this month, but meanwhile iron is rather scarce, and deliveries still take place ex store. The undernoted are the current quotations:

	Deliverable alongside. No. 1.	No. 3.
G. M. B., at Glasgow	92/6	86, to 87/6
Gartsherrie, "	116/	93/
Coltness, "	117/6	100/
Summerlee, "	111/	87/6
Carnbroe, "	100/	88/
Monkland, "	95/	86/6
Clyde, "	95/	87/6
Govan, at Broomielaw	93/6	86/6
Langloan, at Port Dundas	115/	91/
Calder, "	115/	88/6
Glengarnock, at Ardrossan	102/6	89/
Eglinton, "	95/	87/
Dalmellington, "	93/	86/
Carron, at Grangemouth, selected	105/	....
Shotts, at Leith	110/	90/
Kinneil, at Bo'ness	95/	86/
Bar Iron	£10	
Nail Rods	10	

SCOTCH PIG IRON MARKET.

Messrs. James Watson & Co., Glasgow, Aug. 15th, report:

Our market continues firm with a fair business doing. Warrants have fluctuated between 89/6 and 87/, closing to day at 88/6, cash. Shipments last week were 7646 tons, against 8066 tons in the corresponding week of 1873.

	No. 1.	No. 3.
G. M. B., at Glasgow	93/	86/
Gartsherrie, "	115/	91/
Coltness, "	117/6	
Summerlee, "	110/	87/6
Langloan, "	115/	90/
Carnbroe, "	100/	87/
Calder, at Port Dundas	115/	87/6
Glengarnock, at Ardrossan	102/6	88/
Eglinton, "	94/	85/
Dalmellington, "	95/	85/
Shotts, at Leith	110/	90/
Kinneil, at Bo'ness	92/6	86/

THE CLEVELAND DISTRICT.

At the 'change meetings of this district, held at Middlesborough, there has been little or no change in the figures at which makers are holding pig iron, but a more appreciable buoyancy is prevalent. No. 3 foundry pig is in strong demand, and No. 4 forge sells very well at prices which must inevitably be increased almost immediately. A moderately good tonnage of pigs is being sent to Holland, Germany, Belgium and France. The finished iron trade of the locality is not very animated, ship plates being in most request, and bars next in degree. The rail mills are not well employed; a few Russian orders have come to hand, and there are inquiries in the field from the Continent, but it cannot be said that the Cleveland rail trade has a very inspiriting immediate prospect, whatever its ultimate fate in the struggle between iron and steel may be. Light sections of rails are £8. 10/ to £8. 15/, and others about £8 per ton. The Durham coal owners have given notice to their men of a further drop of 20 per cent. in wages, but offer to refer the matter to arbitration. Should a strike again result it would react unfavorably upon the Cleveland trades, but when disposed of, may be beneficial to them by enabling quotations to be reduced.

SHEFFIELD

still complains of a paucity of favors from America for steel, and from the Continent, also, for cutlery goods. The American merchants are, they admit, receiving a few indents for spring and table cutlery as well as for razors and Rodgers' carvers, but it is added that, taking trade as a unit, matters are but indifferent. Some of the factors are not able to grumble about there being few orders, but they do exercise that British privilege in respect of the size of such orders. Many of them, they say, are of infinitesimal proportions, for every kind of spring and table cutlery made, and are, in addition, packed with requests for scissors, and the commissions from the colonies and Northern Europe comprise almost every known article, ranging "from steam engines up to tin whistles." The file and saw trades are growing worse—so much so that in specific cases I hear of prices being put down a little in order to do what is practicable in the way of tempting buyers. The steel trade is, I believe, a trifle more buoyant, but the smaller firms are, as yet, very much exposed to the cold winds of adversity.

MERRY & CUNNINGHAME (LIMITED), GLASGOW, have just issued their second annual report for the period up to June 30th. It is somewhat more interesting than others, and I therefore give it *en bloc:*

"The exceptional prosperity of the iron and coal trades adverted to in last year's reports has, within the last few months, given place to a depression which, it may be hoped, is not less abnormal. The effect on the company of this change of circumstances is exhibited in the result now submitted. Not only has the output and production of the company been greatly restricted by strikes, but the rapid fall of prices anticipated those reductions in cost, which had not, indeed, been completely effected at the close of the financial year. In accordance with the policy explained in last report, the directors continued, during the prevalence of the high prices, to avail themselves of the opportunity of realizing such portions of the stocks of raw material taken over at the 30th of June, 1872, as could be disposed of on favorable terms. The profit realized from this operation is stated separately in the revenue account. * * * The outlays of the nature of improvements or extensions on the original leaseholds which fall to be gradually wiped off out of revenue, amount to £37,270. 9/8, which, with £22,238. 15/4 of similar outlay made last year, makes the total outlay under this head during the two years £59,509. 5/. From this sum has to be deducted the value of the machinery and materials, when these fall to be removed, which may be left as an addition to capital, £6894. 10/, leaving £52,614. 15/. To meet this outlay, there was last year applied £12,666. 5/2, leaving still to be wiped off £39,948. 9/10. From the reports submitted to them the directors have reason to believe that the large amount of these outlays during the last two years cannot be regarded as any measure for the future, and that for several years to come the amount of similar outlay to be provided for will be much less considerable. The directors propose to write off at once the whole of the above £39,948. 9/10, so that the revenue of future years will be relieved of any charge for the extinction of these past outlays, and will be the better able to sustain whatever may be the proper charge for the gradual liquidation of such expenditure of this nature as may in future be found indispensable for the maintenance of the works. The directors have, during the past year, paid a further sum of £20,000 to account of the balance due to the vendors. This leaves £180,000 to be still paid, which, under existing arrangements, must be defrayed before 31st December next. * * * The balance at the credit of revenue account (including the balance brought from last year), after providing for the interim dividend paid on 31st December last, is £65,565. 2/8, out of which the directors proposed to pay a dividend for the half year to 30th June, 1874, at the rate of ten per cent. per annum, free of income tax, payable on the 24th inst., £17,500; and as before explained, the directors propose to write off the balance of the outlay for improvements and extensions, £39,948. 9/10, leaving to be carried forward, £8,116. 12/10."

A QUARTER OF A MILLION PROFIT.

The Stavely Coal and Iron Company, near Sheffield, issued its report to the shareholders on Saturday. The statement of accounts show the year's profits to have been £263,921, or with a balance brought forward there are £289,611 available for distribution. After paying dividends at the rate of thirty per cent., or so, £60,000 are added to the reserve fund, and the neat sum of £32,111 is carried foward. Blessed are the shareholders in the Stavely Coal and Iron Company—for do we not know that old King Coal is a merry old soul? Stavely is about the best managed establishment I know. It was founded by Richard Barrow.

BIRMINGHAM AND STAFFORDSHIRE.

There is no particularly spicy or interesting item of iron trade news this week from the Black country or from "Old Brum," its capital. Staffordshire sheets are in fairly good request, and there is an improved market for hoops and tube strip. Other descriptions of iron—bars, rounds, angles, etc.—are not readily got rid of, and it is only by a dextrous shading of figures that a decent order can be secured. Sheets are generally quoted about £13 to £14, and hoop, £11. 10/, £12 and £12. 10/, with bars at any price between £9. 10 for common and £12 for best brands. The hardware industries are only indifferently engaged, as a rule, but in one or two branches inquiries lead to the belief that renewed activity will shortly be the ruling order of the day.

SOUTH WALES DISTRICT.

Prospects are still of a discouraging nature in the principality, a state of things arising mainly from the disturbed relations between employers and the employed on the wages question. The reduction of 10 per cent. in the iron workers' wages will come into effect, as you are aware, on September 1st, and at a meeting of the coal owners, held at Cardiff on Friday, it was determined to give notice of a drop of 10 per cent., to take effect at the same time as that relating to the iron workers. The district is much excited and greatly unsettled at the cheerless trade outlook, despite which it may be recorded that some of the larger works are turning out a larger tonnage just now than for a long time past. This activity is, nevertheless, merely spasmodic, there being, in fact, no alteration worth noting, either in prices or otherwise.

THE METAL MARKETS

have, in the main, been steady, and prices have been fairly upheld. The latest London metal telegram runs thus: Copper quiet; Chili, £76. 10/, on the spot, and £77, prompt, but little on sale; Wallaroo, £87. 10/; Burra, £86; English dull. Tin firm; Straits, £94. 10/, cash, and £94, to arrive; Australian, £91. 10/ to £93; English firmer. Tin plates unchanged. Spelter and lead unaltered.

METALS.

Messrs. Kelly & Co. say, as to minerals:

"The mineral market can be said to have improved only as regards the labor question, which, although by no means settled, is gradually undergoing subsidence. The general demand for coal appears to have increased, and prices are easier. Ironstone has been not at all brisk, although lower rates are offered. Copper ores find eager buyers. Metalliferous ores generally are scarce and fetch full values. No fresh sources of supply are pointed out. The few holders of tin ore are reluctant to sell at present prices. Lime phosphates, pyrites, and guano in full request. Salt is likely soon to form a new industry on the banks of the Tees. China clay, 42/ to 45/; phosphates of lime, ordinary 60 per cent., 1/; 90 per cent., 1/4 to 1/5 per unit; Bolivian, £6. 15/; Canadian, 80 per cent., 1/4 per unit; Estremadura, 1/3 to 1/5; chrome ores, £6 to £8; copper ores, 15/ to 15/9 the unit; iron ores, red hematites, British, 27/ to 30/; Spanish, none; burnt iron ores, 60 per cent., 6d the unit; manganese ores, 70 per cent., 140/ to 150/; pyrites, cupreous, 8½d.; non-cupreous, 10d. the unit; antimony ore, £10 to £12.

Messrs. French & Smith thus remark: *Tin* firmer. There is an advance of from £1 to £1. 10/ per ton in all descriptions of foreign, and £1 per ton in English. In Holland the price is 58 guilders, firm. Banca, £99 to £100 per ton; Billiton, £95; Straits, fine, £94. to £94. 10/; Straits, afloat or forward, £94; Australian ingot, £92. 10/; English refined, £100; English, common bars, in barrels, £98; English, common block and ingots, £97 per ton. *Tin Plates.*—Charcoal, I. C., 36/ to 41/ per box; coke, I. C., 28/6 to 37/ per box.

The *Mining Journal* (August 15th), says: *Copper.*—This metal has presented no new feature during the week, and although prices continue much the same, they must be viewed rather as quotations than as indicative of business done. For a long time past the trade with the East, which used to form so important a feature in the market, has come almost to an end, but although this be so, still a time must come when the requirements of trade will demand a return to activity. It is not to be supposed that any substitute for this metal has been discovered which should bring it into disfavor, but, on the contrary, is rather to be looked for; indeed, with moderate prices, it is more than probable that copper, in combination with other metals, will be applied to purposes for which it has hitherto been excluded. On Monday 250 tons Chili bars, g. o. b., short arrival, sold in Liverpool at £76. 10/. Small quantity of Wallaroo sold in London at £87. 10/, cash. The market was steady on Tuesday and Wednesday, 125 tons of Chili bars, g. o. b., being sold at £76. 10/, cash; Burra, £86. 10/, and Wallaroo, £87, 10/ on the former day, and 100 tons Chili bars, picked brands, at £77, cash, f. o. b., £76. 10/ sellers; Wallaroo, £87. 10/ on Wednesday. On Thursday, 131 tons ore was sold at 14/6; 117 tons regulus at 15/; and 50 tons Chili bars, f. o. b., at £76. 2/6, cash, net. There was a good demand for English tough at £84, and to-day Chili bars have been done at £76. 10/, the market closing firm at £76. *Lead.*—The market exhibits no new feature. Lead continues firm, and prices are unaltered, but without much doing. *Spelter.*—For some time past transactions in this metal have been limited. The past week has not brought with it any accession to the transactions reported. Ordinary Silesian is still obtainable at £22. 5/ to £22. 10/. No transactions have been reported in hard spelter, which is quoted at £14. 10/ to £15. *Quicksilver.*—The latest transactions have been at £22 per bottle; at this price only limited quantities are obtainable. A few days since, £23 per bottle was obtained. *Tin.*—There is no improvement to record in this metal, and although there has been no material alteration in quotations, still the downward tendency has not been arrested. Until the demand for tin plates shall become more general it is not to be expected that any important improvement should take place. It is currently reported that at existing prices importations from Australia cannot continue, as the lodes there cannot be worked to a profit. On Monday there was a better demand for tin, with an upward tendency. Of 65 tons which changed hands, 25 tons consisted of Straits and 35 tons Australian. Straits, £92. 10 to £93; Australian, £91 to £92. There was a firm market for Straits on Tuesday at £93. 10/ to £94; Australian, 30 tons, at £92, and 15 tons at £93, cash. English ingots, £96, buyers. On Wednesday Straits were quoted £94, cash; 40 tons, to arrive, sold at £94; Australian, £92, cash; English ingots, £96 to £97. There was a fair demand on Thursday for Straits at £94 to £94. 10/; Australian, £92 to £92. 10/; also 300 slabs Banca, £99; and to-day Straits were £94 to £94. 10/, and English, £96 to £97. Tin plates continue firm, in expectation of an improved demand.

Automatic Ore Feeding.

During the late crisis in the coal and iron trades, Mr. Hunter, the managing partner of the Coltness Iron Works, turned his attention to a plan for saving manual labor in the unloading of mineral wagons. At Coltness there are twelve blast furnaces, in two rows of six furnaces each. These rows run parallel, and the space between is about 100 yards, where a line of railway passes with the Caledonian and all the collieries and mines belonging to the Coltness company. On each side of this railway coal and other minerals were hitherto emptied out of the wagons and "binged" for use by the side of the furnaces at a great expense of manual labor. In the new plan most of this labor is dispensed with in this manner: A platform about 150 yards in length, at an elevation of 16 feet, and a top width of 25 feet is erected with a double line of rails for bricks and another double line for steam cranes. The trucks pass the platform on a rising gradient of 1 in 80, and by a back shunt on a similar incline are put upon a platform which is level. Each truck is then taken bodily up by the cranes, which latter are worked by a pair of coupled engines with 4¼ inch cylinder and a 10 inch stroke, and the door being opened, the contents are discharged into the space between the rails, where there is storage accommodation for 7000 tons of coal and other material for use in the furnaces. The empty wagon is again put upon the rails and run to the end of the platform, where an ingenious machine lowers the truck to its original level. The contrivance consists of a cage with a balance. The weight of the wagon lowers the cage, and when the level is reached, the wagon, by means of another appliance, is run into a siding to be taken back to the mines by the locomotives. The cage, as soon as it is freed from the weight, is brought back again to its proper place by means of the back balance. The ease with which the furnace fillers can be loaded is not the least remarkable part of the process. The elevated platform is supported with brick walls 50 feet apart, and two rows of cast iron columns between each of the spaces. Several of these latter are fitted up with triangular-shaped cast iron receptacles for ironstone and limestone, these being so arranged that the exact quantity of the mineral required can be discharged through a shoot into the barrow. So far as the limestone is concerned it can be measured with the greatest precision. By drawing one lever and opening another a box is filled containing the required quantity; thus the laborer can load his barrow, which holds 16 cwt., and leave the box filled for the next comer by two movements of the lever.

The manufacture of cast iron nails and shoe pins is peculiar to the South Staffordshire (Eng.) district, although, curiously enough, the demand for one description, known as lath nails, is almost entirely for Scotland. The smallest nail made is one-quarter of an inch in length, and of these a good workman will mold upward of 750,000 in a day. The largest measure 2½ inches long, and of these a good day's work is about 52,000. The yearly production of cast nails is about 1000 tons.

The Steamer Tagus, loaded with locomotives for Russia, and shells, bullets and fire arms, for Turkey, cleared from this port yesterday. The fire arms consist of 8000 Peabody-Martini rifles (not Remington, as previously reported), from the Providence Tool Company, being a delivery on their contract for 600,000 with the Turkish government. The steamer was specially chartered to carry this cargo.

Happy Accidents.

The cracking of a picture placed in the sunshine set Van Dyck to experimenting to produce a varnish that would dry in the shade. He found what he sought, and found, beside, that by mixing it with his colors, they acquired greater force and brilliancy, and required no subsequent varnishing, so came about the discovery, or re-discovery, of the art of painting in oil. Mezzotinto owed its invention by Prince Rupert to the simple accident of a sentry's gun barrel being rusted by the dew. Henry Seanward, a Nuremburg glass cutter, happened to let some aquafortis fall upon his spectacles, and noticed the glass was corroded and softened where the aquafortis had touched it. Taking the hint, he made the liquid accordingly, drew some figures upon a piece of glass, covered them with varnish, and applied his corroding fluid, cut away the glass around his drawing, so that when he removed the varnish the figure appeared raised upon a dark ground, and etching upon glass was added to the ornamental arts. Alois Senefelder, playwright and actor, thinking it possible to etch upon stone instead of copper, polished a slab for the purpose. He was disturbed by his mother coming into his small laboratory with a request that he would jot down her list of things for the wash, as the woman was waiting to take the basket away. There being neither paper nor ink handy Senefelder scribbled the items on the stone with his etching preparation, that he might copy them at his leisure. Some time afterward,

when about to clean his stone, he thought he might as well see what would be the effect of biting the stone with aquafortis, and in a few minutes saw the writing standing out in relief. Taking up a pelt ball charged with printing ink, he inked the stone, took off a few impressions upon paper, and he had invented lithography. The pelt ball used by Senefelder was long indispensable in a printing office. A Salopian printer, in a hurry to get on with a job, could not find his ball, and inked his form with a piece of soft glue that had fallen out of the glue pot, with such excellent results that he thenceforth discarded the pelt ball altogether, and, by adding treacle to the glue, to keep it from hardening, hit upon the composition of which printers' rollers have ever since been made. Three very different discoveries are recorded to have resulted from the unintentional application of intense heat. Pliny attributes the discovery of glass to some merchants traveling with nitre, who, stopping on the banks of a river to make a meal, were at a loss for stones to rest their kettles upon. Putting them on pieces of nitre, they kindled their fires; the nitre, dissolved by the heat, mixed with the sand, and the merchants were astonished to see the transparent matter flowing over the ground, which was nothing else but glass. Charles Goodyear had for years experimented in vain, hoping to deprive India-rubber of its susceptibility to the action of heat and cold. Conversing with a friend on the subject, he emphasized an assertion by flinging a piece of sulphured rubber across the room. It lighted upon the stove, and when he picked it up a few days afterward, he found the intense heat to which it had been subjected, had conferred upon the India rubber just the quality he had so long striven to impart to it. According to some, he stumbled upon the discovery in a different manner; but, at any rate, vulcanized India rubber was the creation af an accident. A Limerick tobacconist, looking dolefully at his poor neighbors groping among the smouldering ruins of his burnt out shop, noticed that some of them, after trying the contents of certain canisters, carefully loaded their waistcoat pockets from them. He followed suit, and found the snuff had come out of the fiery ordeal very much improved in pungency and aroma. Like a wise man he said nothing, but took another place, set up a lot of ovens, and before long Black Yard snuff—otherwise "Irish Blackguard"—was all the rage with lovers of nasal titillation; and in a few years Lundyfoot was a rich man, owing to the accident he thought had ruined him. A would-be-alchemist, seeking to discover what mixture of earths would make the strongest crucibles, one day found he had made porcelain. Instead of transmuting metals, as he had fondly hoped to do, Bottger, transmuted himself; as if he had been touched with a conjurer's wand, he was on a sudden transformed from an alchemist into a potter.—*Chamber's Journal.*

Improvements and Novelties in Lamps.

Application of the Argand Principle—Improved Flat Wick Burners—Safety Lamps.

II.

Among the more recent applications of th argand principle is

THE COOMBS PATENT SAFETY LAMP,

the peculiar feature of which is a conical tube, which extends from the bottom of the fount to the base of the burner, and is designed to direct a current of air against the flame at its base. The air enters the tube at the bottom of the fount, and since the sides of the tube converge toward the flame, the air strikes the wick with greater force than it would if the tube was cylindrical. The manufacturers claim that a stronger current of air being supplied to the flame, the latter must therefore be brighter. They claim, also, that since a current of cool air is continually passing through the lamp, gases cannot form, and explosion is thereby prevented. If any gas does form, accidentally, its own pressure must drive it down through the tube into the outside atmosphere. A drip cup is formed in the standard just beneath the fount. The wick is very easily placed in the burner, an advantage not often obtained in argand burners. In the reservoir is a float, which serves as an indicator, rising on the surface of the oil, and shows when the lamp is full. The Benedict & Burnham Mfg. Co. are the makers.

THE CRYSTAL LIGHT BURNER

is another argand burner manufactured by Messrs. R. Douglas & Co., of this city. Its prominent feature is the ease with which the wick may be inserted. As in all argand burners, the wick passes between two tubes. In this case the outer tube is fixed on the body of the burner. The inner tube passes down to the base of the burner, becoming wedge shaped at its lower extremity, and terminating in a sharp edge. Three little toothed wheels are located on each side of the wedge, and clutch the wick as it passes up. Those on one side of the wedge are located upon the shaft to which the button is attached, while the other shaft, to which the other wheels are attached, has a small pinion which meshes into a pinion on the main shaft, and is actuated by it. A flat wick is used, and in placing it in position it is slipped over the wedge from the bottom of the burner, and is caught by the toothed wheels. Since there are six such wheels the wick is firmly held, and must move upward.

THE LOVELL BURNER,

sold by F. H. Lovell & Co., 118 John street, is an improved flat wick burner, giving a very large flame. The tube, which contains the wick, is rounded at its top, and the wick is trimmed so as to correspond to this curve. The principle of the curve is that the flame is thereby allowed to spread, on the principle of the bat wing gas burner. A gauze is placed between the burner and the fount to prevent the flame from communicating with the oil. The chimney is flattened to assist in spreading the flame. Whether the flame is high or low, it burns with equal steadiness, and when the lamp is burning at its full capacity the flame is very large and brilliant.

THE PARLOR BURNER

is sold by Mr. Artemus Knapp, of Murray street. Its cone is so constructed that the current of air entering below is directed against the flame so as to ensure perfect combustion. The cone is hinged. The same party also make a glass lamp molded with a rim or guard around the upper portion of the fount. This is to prevent the oil which overflows at the wick from passing down over the outside of the lamp giving it a greasy feeling. The oil overflows in this as in other lamps, but is prevented from greasing the surface by the guard or rim before referred to.

Various expedients have been devised to remove the liability to explosion in the use of kerosene oil. Many patents have been taken out with this object in view, but few of them have been introduced into the market, and fewer have met with any sale. We notice the principal of those sold in New York.

THE EL SOLITO

is very simple in construction, and it is claimed that it prevents the formation of gas by keeping cylinder or inside cone cool. The burner has a double set of holes, one inside and one outside of the cylinder, arranged in such a manner as to supply the requisite amount of air to the flame and to keep the tube cool. The cone is peculiar, also, because it is made of glass, which is a non-conductor of heat, and allows the light to pass through, which would be cut off by the ordinary brass cone. Its most striking peculiarity is its short chimney, which is not more than four inches high. Its base is always cool.

THE PERKINS & HOUSE SAFETY LAMP

is a Cleveland manufacture, quite well known in New York. The following advantages are claimed for it by the manufacturers: It is safe from explosion, will not break, being made of metal; has a patent drip cup, by which it is kept clean, and gives a more brilliant and steady light than is usually obtained from kerosene. In this lamp the air necessary to combustion, instead of passing to the flame just below the burner cone, enters the lamp through apertures at the sides and near the bottom, enveloping the central or wick tube, keeping the oil that it and the fount contains as cool as the surrounding atmosphere. This arrangement prevents the formation of gas. If gas does, by accident, form in the reservoir, it cannot be ignited through the small supply and vent tubes that connect with the wick tube, these being provided with wire gauze. The makers claim that from the peculiar construction of the lamp—with central air passages and closed collar burner—a better draft is obtained, and the flame being supplied with a larger amount of oxygen its brightness is increased, and the odorous matter entirely consumed. The objection to kerosene involved in what is known as sweating, or the overflow of oil which greases the outside of the lamp, is said to be removed in these lamps by an ornamental and acorn-shaped brass cup, attached to the bottom of the founts, with openings between the fount and cup for the passage of air to the central draft of the lamp. This cup serves as a receptacle for the oil which overflows. This firm also makes a safety filling can, provided with an opening in which is inserted a filling tube. Both the filling tube and the nozzle are provided with corrugated tubular flame guards to prevent any flame from passing down into the can.

Utilization of Waste Materials.

From a recently published book by P. L. Simmons, an English author, upon "Waste Products and Redeveloped Substances," the following extracts are made: Among the most curious cases noted, and one outdoing oleomargerine in the marvellousness of the transformation, is that of making table jelly out of old boots, which is made the subject of introduction.

Not long since, at a meeting of a club in New York, a jelly was exhibited on the table, and alongside of it an old, well-worn leather boot. The spectacle of the boot was a mystery until it was explained by one of the members that from the fellow of the boot the jelly had been made by a certain chemical process. Jelly for the table made out of old boots.

What next? We do not hear that the jelly in question was much appreciated as an article of diet. Its manufacture, however, suggests the propriety of reserving old boots and shoes for one or other of the many purposes in which they may be employed, instead of absolutely throwing them away. Indeed, scraps of all sorts can be advantageously utilized, and now very much more so than ever. "Waste materials" is a kind of misnomer, for there is almost nothing absolutely "waste."

What with chemistry and manufacturing ingenuity, there go on around us the most extraordinary transformations. "Chemistry, like a prudent housewife," says Dr. Lyon Playfair in one of his lectures, "economizes every scrap. The clippings of the traveling tinker are mixed with the paring of horses' hoofs from the smithy, the cast off woollen garments of the poorest inhabitants of the sister Isle, and soon afterward, in the form of dyes of the brightest blue, grace the dress of courtly dames. The main ingredient of the ink with which I now write was possibly once part of the broken hoop of an old beer barrel. The bones of dead animals yield the chief constitutent of lucifer matches. The dregs of port wine carefully rejected by the port wine drinker in decanting his favorite beverage, are taken by him in the morning as Seidlitz powders. The offal of the streets, and the washing of coal gas, reappear carefully preserved in the lady's smelling bottle, or are used by her to flavor blanc manges for her friends. This economy of art is only an imitation of what we observe in the chemistry of nature. Animals live and die; their dead bodies, passing into putridity, escape into the atmosphere, where plants again mold them into forms of organic life; and these plants, actually consisting of a past generation of ancestors, form our present food."

It is quite evident from daily experience that there is an immense mass of materials thrown away as useless which might be easily saved and disposed of for general advantage. Paper, for example. What a prodigious waste of note papers, envelopes, pamphlets, circulars and so on? Basketfuls burned or carried to the dust bin. Mr. Simmons asks: "What becomes of the envelopes of the 3,000,000 of letters passing daily through our post offices? all of which are worth preserving, for they will fetch from 2 to 3/ per cwt." Rags, as a more marketable material, are better taken care of; yet, as we are informed, six-tenths are irrevocably wasted.

Marine stores, as they are called, are the well-known establishments at which waste materials are purchased, but much never reaches them. Some years ago, a committee of the London Ragged School set on foot a rag-collecting brigade of boys, with the help of trucks. The enterprise was attended with considerable success. Paper, rags, bones, fat, old carpets, metal, ropes, hats, were collected from householders, who were glad to get rid of the refuse. In nine months the boys gathered upward of eighty-two tons of these materials, beside about 50,000 bottles. One of the articles was a bag containing a million of used postage stamps, which had been collected and stored up by some fanatic.

On old used leather, such as that of the boot, there have been various schemes of utilization. By dissolving the leather by steam and certain acids, it is possible to produce printing rollers for cotton fabrics; but it seems preferable to cut the leather in pieces, mix them with a cementing liquid, and then squeeze the whole into a mass of different thicknesses, according to the purpose required, such as material for making up the soles and heels of boots and shoes. With a quantity of paste and the force of a steam engine, shreds are made to assume the appearance of cakes of leather—technically, pancakes or pasted stock—which are largely used in the wholesale shoe manufacture of Massachusetts. There is another method in that country of using up shavings and scraps of leather. "These are ground to a powder, resembling coarse snuff, and this powder is then mixed with certain gums and other substances so thoroughly that the whole mass becomes a kind of melted leather. In a short time this dries a little, and is rolled out to the desired thickness, perhaps one-twelfth of an inch; it is now quite solid, and said to be entirely waterproof." There are various processes patented for melting down leather waste and producing large sheets of artificial leather possessing waterproof qualities, but we have not space to go into any account of them.

Bones, new and old, wherever they can be picked up, are put to a variety of uses. The fresher kinds of shank bones serve for making the handles of knives, forks and tooth brushes. From some, gelatine is extracted. When not serviceable for these purposes, they are crushed into powder for manure. Bone dust is worth from £5 to £5. 10/ per ton. Farmers buy it in large quantities for fertilizing their fields. The importation of this convenient fertilizer from foreign countries is immense. Stories are told of battle fields being plundered for the sake of the decaying bones of soldiers who have fallen. Researches for the material of bone dust are carried on upon a large scale in the ancient cemeteries and pyramids of Egypt. Long ago, when the people of that country mummified the bodies of their relatives, and stowed them ceremoniously away in caverns, they were not aware that they were only preserving them for manure in a distant European island.

A correspondent of the *Times*, writing from Alexandria, facetiously remarks: "Fancy mutton fattened on ancient Egyptians! The other day at Sakhara I saw nine camels pacing down from the mummy pits to the bank of the river laden with nets, in which were femora, tibia and other bony bits of the human form, some 200 weight in each net on each side of the camel. Among the pits there were people busily engaged in searching out, sifting and sorting the bones which almost crust the ground. On inquiry, I learned that the cargoes with which the camels were laden would be sent down to Alexandria, and thence to be shipped to English manure manufacturers. They make excellent manure, I am told, particularly for Swedes and other turnips. The trade is brisk, and has been going on for years, and may go on for many more. It is a strange fate—to preserve one's skeleton for thousands of years in order that there may be fine Southdowns and Cheviots in a distant land. But Egypt is always a place of wonders."

Lake Superior Ores.

The Marquette *Mining Journal*, of the 29th ult., speaking to and in behalf of the owners of the iron mines in the Lake Superior district, says: The great bulk of the ore sent forward is still unsold, the furnacemen holding off for a still further reduction in prices already ruinously low. The situation is something like this. The mine owners mine their ore at a cost of from $1·50 to $3·50 per ton at the mine, pay cash for railway and lake transportation to Cleveland, where, if the ore is sold at all, they sell at four months' time. By the time the ore reaches the market they have paid out in cash at least seven-eighths of its market value, so that there is a constant outflow of money, with none coming in, for in nine cases out of ten, if they succeed in discounting the paper received in payment for ore, they are obliged to shin around and get the money to take care of it when it becomes due. And while we have tried to reason ourself into the contrary belief, we very much fear that there will be enough ore left on hand in Cleveland at the close of the season to break down the market for next year. This will certainly prove to be the case, unless a sudden revival of trade should create a demand for ore within the next six weeks. There have been no sales of any consequence since the first of June, and there is no immediate prospect of an improvement. All that we can do is to continue whistling to keep up our courage. There is a good time coming but we very much fear it is not in the near future.

Weight of Cast Iron Pipes of Different Thicknesses.

FROM 1 INCH TO 12 INCHES IN DIAMETER—ONE FOOT IN LENGTH.

Diameter.	Thickness.	Weight.	Diameter.	Thickness.	Weight.
Ins.	Ins.	Lbs.	Ins.	Ins.	Lbs.
1	¼	3·06	6½	⅝	34·32
	⅜	5·05		¾	43·68
1¼	¼	3·67		⅞	53·3
	⅜	6·		1	63·18
1½	¼	6·89	7	⅝	36·66
	⅜	9·8		¾	46·8
1¾	¼	7·8		⅞	56·96
	⅜	11·04		1	67·6
2	¼	8·74	7½	⅝	39·22
	⅜	12·23		¾	40·92
2¼	¼	9·65		⅞	60·48
	⅜	13·48		1	71·76
2½	¼	10·57	8	⅝	41·64
	⅜	14·66		¾	52·68
2¾	¼	11·54		⅞	64·27
	⅜	15·91		1	76·12
3	¼	12·39	8½	⅝	44·11
	⅜	17·15		¾	56·16
3¼	¼	22·15		⅞	68·
	⅜	27·56		1	80·5
3½	¼	18·4	9	⅝	46·5
	⅜	23·12		¾	58·92
3⅝	¼	29·64		⅞	71·7
	⅜	19·66		1	84·7
4	¼	25·27	9½	⅝	48·98
	⅜	31·2		¾	62·02
4¼	¼	20·9		⅞	75·32
	⅜	26·83		1	88·98
4½	¼	33·07	10	⅝	51·46
	⅜	22·05		¾	65·08
4¾	¼	28·28		⅞	78·99
	⅜	34·94		1	93·24
5	¼	23·35	10½	⅝	53·88
	⅜	29·85		¾	68·14
	⅜	36·73		⅞	82·68
	½	14·49		1	97·44
5½	¼	31·4	11	⅝	56·34
	⅜	38·58		¾	71·19
	⅜	25·7		⅞	86·4
	½	32·91		1	101·83
6	¼	40·43	11½	⅝	58·82
	⅜	26·94		¾	74·28
	⅜	34·34		⅞	90·06
	½	42·28		1	106·14
5½	¼	29·4	12	⅝	61·3
	⅜	37·44		¾	77·4
	⅜	45·94		⅞	93·62
	½	31·82		1	122·62
	¼	40·56			
	⅜	49·6			
	⅜	58·96			

Launch of a Steam Collier.

Another of the Reading Railroad Company's iron steam colliers, the Pottsville, was launched from the yard of Messrs. Wm. Cramp & Sons, on Thursday last. This ship is the last of a fleet of fourteen constructed for the company, and it is expected that a number of additional ones will be built at the new ship yard, above the Reading coal wharves, during the next two years. The Pottsville is 250 feet long, 37 feet beam and 20 feet depth of hold. She has only one deck, but has a full set of hold beams prepared for putting in a second deck if necessary. She is built entirely of iron, double riveted, with an iron deck, deck houses, hatches and covers, and iron waist. Her iron is from 9-16 to 13-16 inches thick. She has a "water bottom," 42 inches deep, and will carry 500 tons of water in it as ballast when not loaded. She has four water tight compartments, provided with Kingston valves opening from the spar deck, to relieve the hold of water that may collect above the water bottom.

The quarters for the officers and crew will be in the houses on deck. These houses are of iron, bolted fast to the iron deck, and will be provided with iron doors and round lights in brass frames, all of which shut on flanges of vulcanized rubber, thus making it practicable to shut the rooms up hermetically from the sea, the ventilation being supplied from the roof. She has four cargo hatches with iron covers, the flanges of which are lined with rubber. She has two masts, and is square rigged forward and schooner rigged aft, and will spread 2150 square yards of canvass. She is to be provided with an Emerson patent windlass to work by steam or hand; she also will have two Williamson patent hoisting engines for hoisting and discharging cargo, and handling the sails and hatch covers. She will be provided with two Hall's pulsometer pumps, with a capacity of seven hundred and fifty gallons each per minute, with two steam syphons for pumping out the water bottom by steam from either the main or donkey boilers, and one steam pump for pumping, either from the water bottom, the hold or the sea. She will also have one double acting circulating pump for pumping either from the sea or the water bottom, and one bilge pump. She will have a vertical direct acting surface condensing engine of 540 horse-power. Her propeller is 12 feet in diameter, and 16 feet pitch. She will have two return tubular boilers, beside a donkey boiler on the main deck. Her line shaft is provided with solid wrought iron collars, forged on, and the propeller shaft is faced with brass, and runs in lignumvitæ stuffing. She will be provided with apparatus for forcing steam jets in the apartments in case of fire, and will have every provision and appurtenance requisite for a first-class iron steamship.

The launch yesterday was not attended by any peculiar features, the launching of large iron vessels having become so common on the Delaware as to excite but little remark. The steam colliers, Hercules, Reading, Harrisburg, Perkiomen, Lancaster and Panther were lying at the coal wharves, with all their bunting displayed, and saluted the new ship with their steam whistles, as she slid easily and rapidly into the water.

There are about seven hundred men now employed at Cramp's shipyard. The steam collier Centipede is lying at the wharf undergoing repairs. The Williamsport, a sister ship to the Pottsville, is nearly ready for her trial trip, which will take place next week. The monitor Nantucket is undergoing extensive repairs. A new ferry boat is being built to run between the Reading Railroad Coal wharves and Windmill Island. A new tug boat is under weigh for the Delaware and Raritan Canal Company. The steamship Georgia, of Clyde's New York and Savannah line, is being altered from a side wheel into a propeller vessel, and the iron steamship Gulf Stream, also owned by the Messrs. Clyde, has been cut in half, and is being lengthened fifty feet.

Weight of Wrought Iron Gas Pipe.

Inside diam. Inches.	Weights of pipe. Per ft.	Inside diam. Inches.	Weights of pipe. Per ft.
⅛	·34	2	3·66
¼	·42	2½	5·77
⅜	·56	3	7·54
½	·85	3½	9·05
¾	1·12	4	10·72
1	1·67	4½	12·49
1¼	2·25	5	14·56
1½	2·69	6	18·77

The Joliet Iron and Steel Company.—The Chicago *Tribune* says: The meetings of the last two days have in no wise changed the aspect of the company's affairs. Until the debts of the company are met by giving preferred stock therefor, or by some other means, the great works at Joliet will lay idle. The meetings simply amount to giving stockholders who have refused to surrender a share of their stock to liquidate the debts of the company, and creditors who have refused to accept preferred stock for their claims, sixty days more to consider the subject. If at the end of sixty days there is no change in the opinion of withholding stockholders and creditors, bankruptcy will be the end of the company.

The Youngstown *Tribune* says: The assignees of James Ward & Co., Niles, have advertised what is known as the Russia Mill for sale. The property is mortgaged to parties in Warren, and the mortgagers want their money, which is the immediate occasion for the property being offered for sale. It is also stated that the executors of Jacob Stambaugh, deceased, claim an interest as partners. As they have heretofore announced themselves as bankrupt, and unable to contribute anything toward the payment of James Ward & Co.'s debts, the claim is presumptuous, to say the least. The assignees, John R. Grisf, B. P. Jameson and John Stambaugh, are managing matters for the creditors with prudence, and are giving satisfaction to all concerned.

The Bessemer Steel Works of A. Meirer & Co., St. Louis, will, when completed, be a very extensive establishment. The capital of the company is $1,000,000. The works are located on the river bank, directly opposite Carondelet, and the property embraces 100 acres of land, with a frontage on the river of 1197 feet. There will be two blast furnaces, each 60 feet in hight, 17 feet at boshes and 13 feet tunnel head. The East St. Louis and Carondelet Railroad runs through the property, also a narrow gauge road to Cairo and the Big Muddy coal fields. The works are expected to be in operation early in 1875, and will employ 250 hands.

London Metal Market.

(From The Mining Journal.)

	£.	s.	d.	£.	s.	d.
Copper—₱ ton.						
Best Selected	85	0	0	87	0	0
Tough Cake & Tile	83	0	0	85	0	0
Sheathing and Sheets	90	0	0	92	0	0
Bolts	96	0	0	98	0	0
Bottoms	93	0	0	95	0	0
Old	80	0	0	85	0	0
Australian	86	0	0	88	0	0
Wire	₱ lb.	0	1	0¾	—	
Tubes	"	0	1	0¾	0	1 1
Brass—₱ lb.						
Sheets		0	0	10	0	0 11
Wire		0	0	10¾	0	0 11
Tubes		0	0	11	0	0 12
Yellow Metal Sheathing		0	0	7¾	0	0 8¼
Sheets		0	0	7¾	—	
Spelter—₱ ton.						
Foreign on the spot		22	10	0	—	
" to arrive		22	7	6	—	
Zinc—₱ ton.						
In Sheets		23	10	0	23 15	0
Quicksilver—₱ bottle		22	0	0	—	
Tin—₱ ton.						
English Blocks		97	0	0	98 0	0
Ditto Bars (in bris.)		98	0	0	99 0	0
Ditto Refined		100	0	0	—	
Banca		96	0	0	98 0	0
Straits		95	0	0	96 0	0
Australian		98	10	0	—	
* **Tin Plates**—† ₱ box.						
IC Charcoal	1 qual.	1	16	0	nom.	
IX "	1 qual.	2	0	0	"	
IC "	2 qual.	1	15	0	"	
IX "	2 qual.	2	1	0	"	
IC Coke		1	8	0	1 10	0
IX "		1	14	0	1 16	0
Canada Plates	₱ ton.	19	0	0	—	
"	at works	18	10	0	—	
Iron—₱ ton.						
Bars Welsh, in London		9	5	0	9 10	0
"	to arrive	9	0	0	9 5	0
Nail Rods		11	0	0	—	
Nail Rods, Staff'd in L'ndon		11	0	0	—	
Bars		11		0	14 0	0
Hoops		12	0	0	13 0	0
Bars at Works		10	0	0	11 0	0
Hoops ditto		11	0	0	14 0	0
Sheets, single, and plates		13	0	0	15 0	0
Pig, No. 1, in Wales		5	0	0	6 10	0
Refined metal ditto		7	0	0	8 0	0
Bars, common ditto		8	10	0	—	
Do, merchant, Tyne or Tees		9	0	0	—	
Ditto, Railway, in Wales		7	0	0	8 0	0
Ditto, Swedish, in London		15	0	0	17 —	
To arrive		16	0	0	17 0	0
Pig, No. 1, in Clyde		3	15	0	4 0	0
Ditto, f.o.b., Tyne or Tees		4	0	0	5 0	0
Ditto, Nos. 3, 4, f.o.b.			—		—	
Railway Chairs		6	0	0	5 5	0
" Spikes		12	10	0	14 0	0
Indian Ch'coal Pigs in L'don		10	0	0	12 0	0
Steel—₱ ton.						
Swedish, in kegs (rolled)			—		—	
Ditto (hammered)		19	10	0	—	
Ditto, in faggots		21	0	0	—	
English, spring		23	0	0	25 0	0
Lead—₱ ton.						
English Pig, common		21	5	0	21 10	0
Ditto, LB		21	5	0		
Ditto, WB		21	15	0	22 0	0
Ditto, Sheet		22	10	0	—	
Ditto, Red Lead		23	0	0	—	
Ditto, White		30	0	0	32 0	0
Ditto, Patent Shot		23	0	0	25 15	0
Spanish		21	0	0	21 5	0

* At the works 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brand.
† Add 6s. for each X.

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Cheap Pistol Made.

Send at once for a new

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The most complete ever published, containing Cuts and Prices of

Breech and Muzzle Loading Guns, Rifles, Pistols, Flasks, Pouches, Gun Material, Ammunition, Key Blanks, &c.

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Inquiries must be written on paper with business heading, or business card enclosed.

MILLERS FALLS COMPANY, No. 78 Beekman Street, New York,

BARBER RATCHET BRACE.

This Brace has a Lignumvitæ Head, Rosedle, Wrought Iron Sweep, Malleable Iron Nut & Socket, with

Cast Steel Jaws, Pawls and Rachet Wheel,

It is beautifully finished, and in all respects the

MOST PERFECT BRACE IN MARKET.

Is places where there is not room to revolve the sweep, a slight back and forth motion will drive the bit in or out. They cost only 50 cents more than the same style of brace without the Ratchet attachment, and will surely come into general use.

For Sale by all Hardware Dealers.

Miller's Falls Co.,

No. 78 Beekman St.,

NEW YORK.

IRON CUTTERS.

This is the most powerful Cutter in use, and just what is needed by all retail iron dealers. Also by shipbuilders, manufacturers, and all others having iron to cut. It will cut iron twice as large as any other machine of the same cost.

Weight.	Cuts.	Price.
No. 1, 16 lbs.,	⅜x3 in., or ½ in. round or sq.	$25
No. 2, 165 lbs.,	⅝x3 in., or ¾ in. " "	50
No. 3, 312 lbs.,	⅝x4 in., or 1 in. " "	75

GLASS CUTTERS.

Our Glass Cutters are made with a handle like a Glaziers Diamond, but, instead of the diamond point, they have a small hardened steel revolving wheel, the sharp edge of which cuts nearly as well as a diamond. They are durable, and will give entire satisfaction.

WITH THIS

BRACKET SAW

An infinite number of useful and ornamental articles can be made. It will pay for itself every day when in use. The frame is 5x12 in., and made of red cherry wood, beautifully polished.

For sale at all Hardware stores.

Millers Falls Co.,

78 Beekman St., N. Y.

In addition to the 20 Cast Steel Tools inclosed in this handle, it will hold anything from an 8 inch Mill File to a Cambric Needle. It is by far the best Tool Holder in use, and will also answer nearly all the purposes of a Hand Vise. The wood is lignumvitæ and hard maple, the ferrule, malleable iron, and the jaws cast steel. Most hardware dealers keep them, or will send to us for them.

MILLERS FALLS CO, 73 Beekman St., N. Y.

Manufacture **Barber's Bit Braces, Miller's Falls Vises, Little Giant Iron Cutters, Adjustable Chuck Breast Drills, Family Tool Chests, Pratt's Boiler Tube Scrapers, Patent Angular and Ratchet Drilling Machines, Langdon Mitre Boxes.**

A Written Guarantee given with our Pumps.

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Fan Blowers.

Piston Blowers,

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STEAM PUMPS for all duties required.

Centrifugal, Hand and Power Pumps, Special Double Plunger Pumps for Mining Purposes. Boiler Feed and Tank Pumps.

HOWARD PARALLEL BENCH VISE.

MANUFACTURED BY

Howard Iron Works, Buffalo, N.Y.

Send for price list.

RUSSELL & ERWIN MFG. CO., New York and Philadelphia, Agents.

NOTICE.

These **Vises** are only manufactured at the **HOWARD IRON WORKS**, at **Buffalo, N. Y.** and are so stamped. The improvements in these **Vises** which are patented are valuable, and parties who claim to manufacture, and are offering a **Vise** representing it to be the same as the **HOWARD VISE**, are deceiving the Trade.

HOWARD IRON WORKS.

The Fisher & Norris Eagle Anvil Works.

(ESTABLISHED 1843.)

These Anvils are manufactured at the oldest Anvil Factory in this country. They are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvils, after a time, become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils being of crystallized iron, no such settling can ever occur; and the steel face, therefore, remains perfectly true. Also, it has the great advantage, that being of a more *solid* material, and consequently with less rebound, the piece being forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as with a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one-fifth lighter* than that required when using a wrought iron anvil which is more elastic.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, after being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off*.

REDUCED PRICE LIST. ANVILS weighing 100 lbs. to 800 lbs., 11c. per lb.

Smaller Anvils, ("Minims.")

No.	0	1	2	3	4	5	6	7	8	9
Weighing about	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price,	$3·50	$4·25	$5·00	$6·50	$8·00	$7·50	$9·00	$9·00	$10·00	$10·50

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade).

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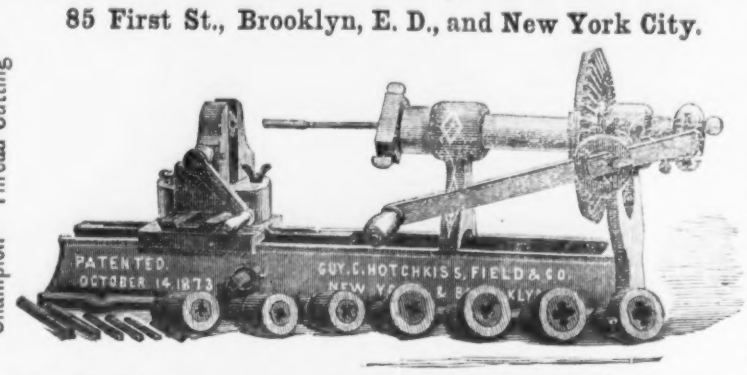
"Champion" Thread Cutting and Nut Tapping Machine.



This machine has revolving and sliding jams, which enables the operator to cut all kinds work, no matter how irregular in shape it may be. It cuts a perfect thread at once going over. As much work can be done in one hour by this machine as in a day with stocks and dies. Send for Circular.

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1. It is all cast iron—simple in its construction, and no machinery to get out of order. 2. It is a perfect gas and smoke most powerful heater. 4. The fire is under perfect control at all times. 5. It combines the reverbtible flue and exposed fire chamber. 6. It ventilates the room perfectly. 7. No dust or ashes escape into the room while managing it. 8. Has shaking and dumping grate with ash drawer. 9. The fire-pot being exposed to the cold air, will outlast any in use. 10. The fire will keep from 30 to 30 hours without replenishing. 11. The parts directly exposed to the fuel can be replaced with but little trouble and expense. 12. Its operation is perfect with the poorest coal found in the West. 13. All parts of the base are heated perfectly. 14. Its beauty of design gains for it admission into any parlor. 15. It is especially adapted for the use of a Tea-kettle, from which boiling water can be had in a few moments.

Standard Soft Coal Burner of the West.

The Manufacturers have made it a specialty for the past six years. It is guaranteed in every respect to be a perfect Soft Coal Burner and without a rival. Send for Samples and Catalogue to

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Are now prepared to furnish a *very superior quality of Genuine Corundum*, from the *Unionville Mine, Chester County, Pa.*, which is the largest known deposit of Corundum in the world. It is harder than Emery or any other known Mineral except the *"Diamond,"* and superior in its cutting qualities for the polishing or cutting of steel, iron or other hard substances for which Emery has been used.

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AND

Angular Extension BORER.

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SOLE MANUFACTURER OF

ANGULAR EXTENSION BORER.

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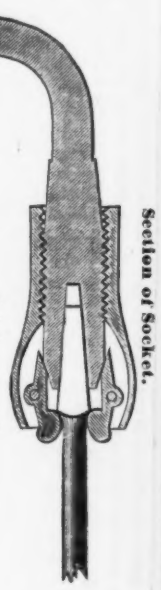
Extension Borer.

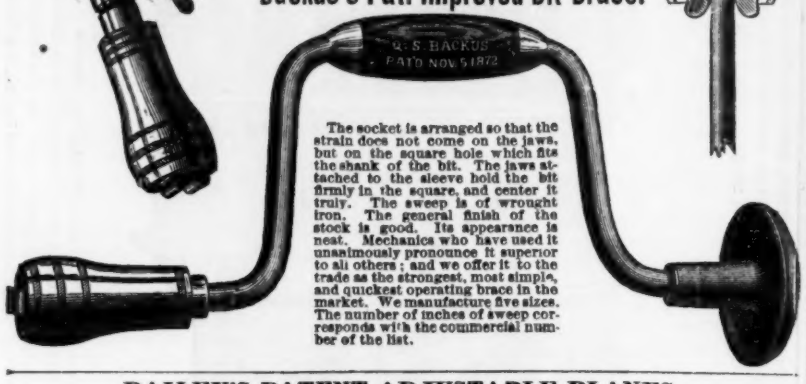


Section of Socket.

This tool can be used in any brace, at any angle, and also for straight work. Is the best and most convenient tool of its kind ever offered to the public. Eight thousand sold the first year.

Also Manufactures the Straight Extension

Backus's Pat. Improved Bit Brace.



The socket is arranged so that the strain does not come on the jaws, but on the square hole which fits the shank of the bit. The jaws attached to the sleeve hold the bit firmly in the square, and center it truly. The sweep is of wrought iron. The general finish of the stock is good. Its appearance is neat. Mechanics who have used it unanimously pronounce it superior to all others; and we offer it to the trade as the strongest, most simple, and quickest operating brace in the market. We manufacture five sizes. The number of inches of sweep corresponds with the commercial number of the list.

BAILEY'S PATENT ADJUSTABLE PLANES.

Thirty different styles in

IRON AND WOOD. **70,000 ALREADY IN USE.**

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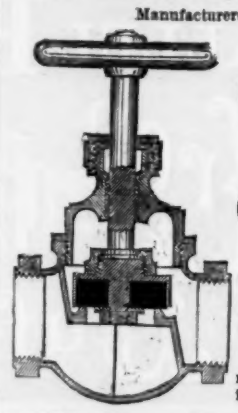

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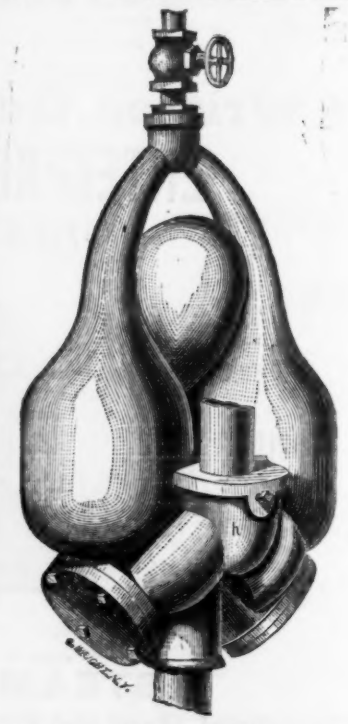

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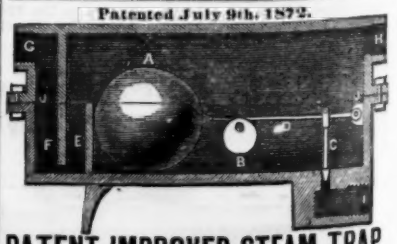

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Goodspeed & Wyman, Winchendon, Mass.....
Place George & Co., 121 Chambers, N. Y.....
Pratt & Whitney Co., Hartford, Conn.....
Sellers Wm. & Co., 1600 Hamilton, Phila.....
Watson Andrew, 537 Dickinson, Phila.....
Wetherill Robert & Co., Chester, Pa.....
Wood Thomas, 2106 Wood, Phila.....

Machine Screws, *Makers of.*
American Screw Co., Providence, R. I.....
Lyon & Fellows Mfg. Co., Williamsburg, N. Y.....

Machinists' Tools, *Makers of.*
Blaisdell P. & Co., Worcester, Mass.....
Harrington Edwin, 15th st. and Pa. ave., Phila.....
Star Tool Co., Providence, R. I.....

Machinery and Tools, *Importers of.*
Churchill Charles & Co., 28 Wilson St., Finsbury, London, England..... 9

Mathematical Instruments.
Keuffel & Esser, 116 Fulton, N. Y.....34

Measuring Tapes.
Eddy Geo. & Co., 353 Classon Ave., Brooklyn, N. Y..24

Meat Cutters. *Makers of.*
Whittemore D. H. Worcester, Mass..... 7

Metal Dealers and Brokers.
Coddington T. B. & Co., 25 and 27 Cliff, N. Y..... 2
Coit Edward W., 205½ Walnut, Phila..... 4
Cort N. L. & Co., 220 & 222 Water, N. Y..... 2
Crane U. O., 104 John, N. Y..... 4
Gregg H. L. Co., 108 Walnut, Phila..... 4
Holmes & Lissberger, 255 & 357 Pearl, N. Y..... 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila.....16
Quincy J. W., 98 William, N. Y..... 2
Thomson & Co., 213 and 215 A. A. Water, N. Y..... 2
Van Wart & McCoy, 43 Chambers, N. Y..... 2

Metallurgists.
Britton J. Blodgett, 339 Walnut, Phila..... 5
Drown Thomas M., 1123 Girard, Phila..... 5
Maynard & Van Rensselaer, 24 Cliff, N. Y..... 5
School of Mines, E. 49th, N. Y..... 5

Mining Spikes.
Roseberry Geo. D., Pottsville, Pa..... 4

Molders' Tools.
Carter H. & Sons, 290 Pearl, N. Y.....27

Mouse Traps, Catchemalive, *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y.....36

Nickel Platers.
New York Nickel Plating Co., 133 West 25th, N. Y...23

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, Frankford, Phila.....36

Note Broker.
Gallaudet P. W., 3 and 5 Wall, N. Y..... 2

Nuts, Bolts, etc., *Makers of.*
American Bolt Co., 210 Lawrence, Lowell, Mass.....13
Arms, Bell & Co., Youngstown, O.....12
Carpenter David, 402 Water N. Y..... 4
Clark Bros. & Co., Millsdale, Conn.....12
Fuller Lord & Co., Boonton, N. J..... 4
Haskell W. H. & Co., Pawtucket, R. I.....12
Old Colony Rivet Works, 116 Chambers, N. Y.....12
Roseberry Geo. D., Pottsville, Pa..... 4
Russell, Birdsall & Ward, Port Chester, N. Y.....36
Plumb, Burdict & Barnard, Buffalo, N. Y.....36
Sternbergh J. H., Reading, Pa.....12
Union Nut Co., 78 Beekman N. Y.....27

Oilers, *Makers of.*
Austin J. & Co., 168 Fulton, N. Y.....12

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia..... 5

Ore Crushers.
Blake Crusher Co., New Haven, Ct.....34

Paints.
Rocky Mountain Vermillion Paint Co., Prov., R. I.. 3

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton. N. Y.....

Patent Solicitors.
Brieson A. V., 258 Broadway, N. Y.....16
Howson & Son, Phila. and Washington, D. C. 15
Whitney J. A., 128 Broadway, N. Y.....15

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y..... 3

Pipes, Fittings, etc., *Makers of.*
Eaton & Cole, 58 John, N. Y.....22
McNab & Harlin Mfg. Co., 56 John, N. Y.....22
Nelson, Finkel & Co., 439 E. 10th st., N. Y.....22
Pancoast & Maule, 227 Pear, Phila.....22
Chas. Gregg Mfg. Co., 62 and 64 Gold, N. Y.....22

Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 112 Leonard, N. Y..... 6
Graff William & Co., Pittsburgh, Pa.....22
McNeal John & Sons, Burlington, N. J.....
Morris, Tasker & Co., 15 Gold, N. Y.....22
National Tube Works Co., 78 William, N. Y.....22
Starr Jesse W. & Sons, Camden, N. J..... 6
Warren Foundry & Mach. Co., Phillipsburg, N. J....22
Wood R. D. & Co., 173 Broadway, N. Y..... 2

Piston Packing.
Canfield John & Co., 131 Fairmount Ave., Phila.....30

Plane Irons. *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn..... 6
Middletown Tool Co., Middletown, Conn..... 8
Sandusky Tool Co., Sandusky, O.....30

Planes, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn..... 6
Greenfield Tool Co., Greenfield, Mass..... 10
Ohio Tool Co., Columbus, O..... 9
Stanley Rule & Level Co., 85 Chambers, N. Y.....22

Plated Ware.
Rogers & Bro., 208 Broadway..... 9

Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y.....26

Plumbers' Materials, *Manufacturers of*
Carr Wm. S. & Co., 106 Centre, N. Y.....22

Portable and Stationary Forges.
Kellogg Wm. P. & Co., 121 Chambers N. Y.....34
Keystone Portable Forge Co., 120 Exchange place, Philadelphia..... 6
Manning H. S. & Co., 111 Liberty, N. Y..... 6

Presses, Power. *Makers of.*
Am. Saw Co., Trenton, N. J.....36
The Stiles & Parker Press Co., Middletown, Ct.....34

Pressure Blowers. *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston.....35

Pumps, *Makers of.*
Burlingham & Purdy, 103 Chambers St..... 7
Douglas W. & B., Middletown, Conn..... 7
Rumsey & Co., Seneca Falls, N. Y..... 7
Union Mfg. Co., 99 Chambers, N. Y..... 7
Valley Mch. Co., Easthampton, Mass..... 7

Pyrometers.
Brown Edward, 311 Walnut, Phila.....

Railroad and Miners' Tools.
Hogan, Clark & Sleeper, Boston..... 9

Railroad Supplies.
Potter, Hoffman & Co., 110 Liberty, N. Y.....10

Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y.....32
Smith Gilead A. & Co., 62 Broadway, N. Y..... 4

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa..... 6
Cambria Iron Co., Johnstown, Pa..... 5
Cleveland Rolling Mill Co., Cleveland, O..... 6
Griswold John A. & Co., Troy, N. Y.....32
Milwaukee Iron Co., Milwaukee, Wis..... 6

Razor Straps, *Makers of.*
B. F. Badger, Charlestown, Mass..... 6

Refrigerators.
Lesley Alex. M., 224 W. 23d, N. Y.....26

Rivets.
Old Colony Rivet Works, 116 Chambers, N. Y.....12
Timmes Peter, 251 North 6th, Brooklyn, E. D..... 4

Rolling Mill Machinery, etc., *Manufacturers of.*
Birmingham Iron Foundry, Birmingham, Ct..... 4
Moore James, Cor. 16th and Buttonwood, Phila.....34

Rolls, Chilled and Sand, *Makers of.*
Garrison A. & Co., Pittsburgh, Pa..... 4

Rules, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Ct..... 6
Stanley Rule and Level Co., 85 Chambers St.....22

Saws, *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind.....10
American Saw Co., Trenton, N. J.....10
Boynton E. M., 80 Beekman, N. Y.....10
Flint J., Rochester, N. Y.....10
Disston Henry & Sons, Phila.....25
McNeice Wm., 615 Cherry, Phila.....10
James Ohlen, Columbus, O.....10
Peace Harvey W., Williamsburg, N. Y.....10
Spear & Jackson, 116 Duane, N. Y.....28
Wheeler, Madden & Clemson, Middletown, N. Y.....10

Saw Frames, Wood, *Makers of.*
Boynton E. M. 80 Beekman, N. Y.....10
Peace Harvey W., Williamsburg, N. Y.....10

Scales. *Manufacturers of.*
Richie Bros., 9th near Coates, Phila..... 8
Shattuck W. F. & Co., 113 Chambers, N. Y..... 7

Screws, *Makers of.*
American Screw Co., Providence, R. I.....13
Miles F. S., 208 Quarry, Phila.....12

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y..... 5
Field Alfred & Co., 47 John, N. Y.....29
Guental George & Son, 39 W. 4th, N. Y.....10

Shovels, &c.
Birmingham Shovel Co., 31 Chambers, N. Y..... 9
Clement & Hawkes Mfg. Co., Northampton, Mass....29

Skates.
Graham & Haines, 88 Chambers, N. Y.....30

Smelting Works.
Reeves Paul S., 700 South Broad St., Phila.....36
Du Plaine & Co., 1320 Callowhill, Phila.....31

Stamped and Japanned Tin Ware.
Schelder Jos. & Co., 58 Beekman, N. Y..... 6
Shepard Sidney & Co., Buffalo, N. Y.....27

Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y.....35

Snaps, Harness. *Makers of.*
Middletown Tool Co., Middletown, Conn.....28

Spiegel.
Quincy John W., 98 William, N. Y..... 2

Springs.
Rowland Wm. & Harvey, Frankford, Phila.....36

Squares, Steel and Iron, *Makers of.*
Hart, Bliven & Mead Mfg. Co., 248 Pearl, N Y..... 9

Steam Pumps, etc., *Manufacturers of.*
Carr A. 48 Cortlandt N. Y.....29
Enterprise Hydraulic Works, 2258 Race St., O.....31
Guild & Garrison, Williamsburgh, N. Y.....34
Hall C. Henry & Co., 20 Cortlandt, N. Y.....23
Philadelphia Hydraulic Works, Evelina street, east of Third street, Phila.....35
Steele & Condict, 88 Liberty, N. Y.....29

Steam Traps,
Alonzo L. Jones, 150 S. 4th, Phila.....32

Steel Castings.
The McHaffie Steel Castings Co., Evelina and Levant Streets, Philadelphia.....16

Steel Importers.
Carr J. & Riley, 82 John, N. Y.....32
Cooker Bros., Sheffield, England.....32
Congreve Chas. & Son, 104 and 106 John, N. Y.....32
Robson Francis & Son, 97 John, N. Y.....32
Jessop Wm. & Sons, 91 and 93 John, N. Y.....32
Moss F. W., 80 John, N. Y.....32
Piersons & Co., 24 Broadway, N. Y.....32
Sanderson Bros. & Co., 16 Cliff, N. Y.....32
Sanderson Geo. & Co., 97 John, N. Y.....32
Van Wart & McCoy, 43 Chambers, N. Y.....32
Wardlow S. & C., 18 Gold, N. Y.....32
W. Hawksworth, Ellison & Co., 72 John, N. Y.....32

Steel Manufacturers.
Anderson & Woods, Pittsburgh.....33
Chrome Steel Co., Brooklyn, E. D.....32
Cleveland Rolling Mill Co., Cleveland, O.....32
Gautier D. G. & Co., Jersey City, N. J.....32
Griswold John A. & Co., Troy, N. Y.....32
Hussey, Wells & Co., Pittsburgh.....34
Miller, Barr & Parkin, Pittsburgh.....32
Reiter, Sutton & Co., Pittsburgh, Pa.....33
Reese, Graff & Woods, Pittsburgh.....33
Rowland Wm. & Harvey, Frankford Phila.....36
Singer, Nimick & Co., Pittsburgh.....32

Stone Crushing Machines.
Blake Crusher Co., New Haven, Ct..... 9

Stoves.
Burdett, Smith & Co., Troy, N. Y.....21

Stove Boards, *Manufacturers of.*
Shepard Sidney & Co., Buffalo, N. Y.....27

Stove Polish, *Makers of.*
"Gem" Stove Polish, 172 Forsyth, N. Y.....36

Twist Drills, *Makers of.*
Morse Twist Drill & Mach. Co., N. Bedford, Mass....31

Tackle Blocks, *Makers of.*
Burr & Co., 31 Peck Slip N. Y.....31

Tacks.
American Tack Co., 117 Chambers, N. Y.....13
Field A. & Sons, Taunton, Mass..... 9
Grundy & Kenworthy, 165 Greenwich, N. Y.....32
Loring Samuel, Plymouth, Mass.....32

Tea Trays, *Importers of.*
Dickinson Henry, 66 and 68 Reade, N. Y.....11

Tinners' Tools and Machines.
Headley W. L., 35 William, N. Y..... 3

Tube Expanders.
Dudgeon Richard, 24 Columbia, N. Y.....34

Valves, Gas, Water and Steam.
Ludlow Valve Mfg. Co., N. Y.....35

Vises.
Backus Vise Co., 78 Beekman, N. Y.....18
Fisher & Norris, Trenton, N. J.....18
Harrisburgh Foundry & Mch. Co., Harrisburgh, Pa...28
Merrill Chas. & Sons, 556 Grand, N. Y.....14
Howard Iron Works, Buffalo, N. Y.....21
Trenton Vise & Tool Works, 101 & 103 Duane, N. Y..21
Wilson Mfg. Co., 37 Chambers N. Y.....12

Water Filters.
Jewett John C. & Sons, Buffalo, N. Y.....24

Water Meters.
National Meter Co., 95 John, N Y.....23

Welding Compounds.
Schierloh H., 21 Exchange Place, Jersey City, N. J... 3

White Lead, *Manufacturers of*
Brooklyn White Lead Co., 89 Maiden Lane, N. Y....28
Colgate Robert & Co., 287 Pearl, N. Y.....28
Jewett John & Sons, 182 Front, N. Y.....28
Lewis John T. & Bros., 231 S. Front, Phila., Pa.....28
Wetherill & Bro., 31st, below Chestnut, Phila.....28

Wire, *Manufacturers of.*
Gilbert, Bennett & Co., 273 Pearl, N. Y..... 2
Prentiss Geo. W. & Co., Holyoke, Mass..... 2
Townsend W. P. & Co., Pittsburgh, Pa..... 4
Washburn & Moen Mfg. Co., Worcester, Mass..... 2

Wire Goods. *Manufacturers of.*
Gilbert, Bennett & Co., 273 Pearl, N. Y..... 2
Howard & Morse, 45 Fulton, N. Y..... 2
Parker Sam'l & Co., Wethersfield, Ct..... 2

Wire Rope, Iron and Steel, *Makers of.*
Roebling's John A. Sons, Trenton, N. J..... 2

Wood Working Machinery, *Makers of.*
S. A. Woods Machine Co., 91 Liberty, N. Y.....38

Wrenches. *Manufacturers of.*
Austin J. & Co., 168 Fulton, N. Y.....22
Bemis & Call Hardware & Tool Co., Springfield, Mass..28
Coes A. G. & Co., Worcester, Mass.....28
Coer L. & Co., Worcester Mass.....28

DIVINATION BY FIRE.

The Ordeal of Fire—Power of the Human Body to Resist Heat.

(Concluded.)

In earlier ages, when fire was worshipped, it was not surprising that it should be used to sacrifice infants as an offering of purity, and prisoners of war as propitiation to martial gods. Some nations of Syria, and also the Hindoos, were much addicted to the former, and the larger part of ancient pagans practiced both customs. The numerous human sacrifices of the Aztec nations, and the fondness of North American Indians for roasting prisoners of war, are part of the history of our hemisphere. The subject of human sacrifice, however, it is not our purpose to consider. After it had begun to be less common in the world, it was succeeded by the ordeal of fire, which was applied as a test to persons accused of crimes and heresies. It was understood that whoever could pass between a long, close row of lighted faggots, over heated iron, barefooted, or into boiling water or oil, without injury, was innocent, and to the flame was ascribed a certain undefined power of purification. From time immemorial the Tartar tribes had a custom that when any stranger, traveler, ambassador, or even foreign king, came amongst them, he must pass between a row of fires, not necessarily to injure him, if he used proper care, but intended to purge out any evil spirit accompanying him.

It appears that the secret of the preparation by which human beings withstood an ordeal by fire, without some resisting preparation being applied to the body, must have been discovered before, or soon after the commencement of such trials, or else no escapes could ever have varied the dull routine of the burning or scalding of supposed criminals. This custom, as the successor of phallic and fire worship, and the contemporary of all idolatry, and the forced mutual connubial cremation of India, is well worthy of attention, for it develops curious phases of mind and character, some of which it is intended here to portray. Its history, to within two hundred years of this time, is not complimentary to many of our forefathers, to whom we are frequently fond of tracing our ancestral lines.

In Europe, before the age of chivalry and the trial by jury, and in almost all partially civilized countries, men, incapable of confuting error or ascertaining the truth, have, at all times, desired some miracle to expose the criminal or to clear the innocent. Modern science has explained the real reason of the mode of avoiding the said ordeals; such means, although practiced by the ancients, not having been fully understood by them. They generally bathed the whole body, or rubbed some parts with certain liquids, and sometimes liniments, mingling with them various drugs, among which a principal one was alum, though it was kept more secret. They claimed that the whole effect was caused by the drugs, but required that the test be made while the part to be exposed to trial was damp.

Although a concentrated solution of alum has a very extraordinary effect in such resistance, we now know that the spheroidical condition of water, or the formation of steam between the skin and a molten metal, is sufficient to account for the miracle. Those expert in the matter can, it is said, by so dampening the hands, wash them unharmed in molten iron as it flows from the furnace. It adds to the safety, in such case, to use first a strong solution of alum, then dry, rub with the best soap, and finally dampen for the trial.

Albertus Magnus informs us, that one of the medicated liniments used in ordeals consisted of powdered lime, formed into a paste with the juice of the radish, the white of an egg, the juice of the marsh-mallow, and the seeds of the flee-bane. He adds that if one coat of this be applied to the part of the body to be exposed and allowed to dry, and another coat laid on afterward, such part will be preserved from the effects of fire.

A writer of the sixteenth century (E. Taboureauz, *Desfaux Sorciers*) states that it is sufficient to wash the hands in wine lees, and subsequently steep them in fresh water, to allow molten lead to pass over them without injury. The ancient art of weaving cloth from asbestos, and of rendering common cloth incombustible by the use of alum, were also great aids to those initiated individuals who were to save persons threatened with the ordeals, and these arts were much better understood formerly than at present.

Various experiments have proved that the living human body has an extraordinary power of resisting heat, provided it does not come into immediate contact with the burning substance. The experiments instituted some years ago by Duntze and Tillet, in Europe, and by Dr. Fordyce, Sir Joseph Banks, and Mr. Bladgen, in England, proved that a temperature of between 198° and 269° F. may be borne with impunity if the feet of the person be covered with flannel, which is a non-conductor of heat. To prove the influence of this temperature on inanimate bodies, they placed eggs and a beefsteak upon a tin frame in a room heated to 300° F., and near to the thermometer. In the space of twenty minutes the eggs were roasted quite hard, and in forty-seven minutes the steak was overdone and dry.

The wife of a baker, at Rochefaucault, was in the daily habit of entering the oven clothed in flannel, and remaining long enough to remove all the loaves. Dr. Brewster states that the workmen of the late Sir Francis Chantry entered the oven employed for drying the molds, which was an iron apartment, fourteen feet in length, twelve feet in height, and twelve feet broad, the temperature of which with closed doors was 350° F., and the iron floor red hot. They were protected from the heat of the floor by wooden clogs, the soles of which were, of course, charred on the surface. On one occasion, Chantry and several friends entered the furnace, and after remaining two minutes they brought out a thermometer which stood at 320° F. Some of the party experienced sharp pains in the tips of the ears and in the septum of the nose, while others felt a pain in their eyes. These experiments prove the extraordinary degree of heat which the living body can bear with impunity, and favor the possibility of persons passing uninjured through flame, provided the body can be guarded from the effects of fire by a non-conducting covering of an incombustible nature.

In Hindostan the antiquity of this ordeal goes back to the reign of the gods. Sita the wife of Rama, the sixth incarnation of Vishnu, submitted to it, and stood upon red hot iron, to clear herself from the injurious suspicions of her husband. "The foot of Sita," says the Hindoo historians, "being clothed in innocence, the devouring heat was to her as a bed of roses."

Zoroaster, the great teacher of fire-worship, to confute his caluminators, allowed melted lead to be poured over his body, and he received no injury. His biographer is silent as to whether he used a preventive similar to that of the Hindoo pandits, and mentioned in *Recherches Asiatiques*, tome i, p. 482; but it does appear that his adversaries, previous to the trial, rubbed his body with various drugs, probably in the hope of destroying any such safeguard which they might have suspected, but which they did not succeed in neutralizing. Long before this, in his initiation, Zoroaster had undergone the most frightful trials by fire, as an evidence of his prophetic mission; and, as Egypt was pre-eminently the land of mystery and priestly initiations, it is reasonable to believe it was not backward in similar rites. Of course, baths or lotions were used; and to the drugs therein, and the influence of some special deity, was ascribed the preservation, so that the neophyte received an immense accession of enthusiasm and faith. The secret means were not revealed to him until he, in his turn, was sufficiently advanced to receive the explanation.

The ordeal by fire, and the secret of enduring it, were very early known in Greece, and were probably received with architecture, letters and arts from Egypt. Sophocles makes the Thebans, suspected of exhuming the body of Polynicius, exclaim: "We are prepared to prove our innocence by handling heated irons, or walking on the flames."

Ancient jugglers have succeeded much better than their modern imitators in vomiting fire. Both Eunus, the Syrian slave, who assumed to have communication with the gods, and Barochebus, who headed the revolt of the Jews against Adrian, actually taking Jerusalem, A. D. 132, and holding it for three years, appeared to vomit flames when speaking. Great was the awe this occasioned among the multitude, and it was regarded as a miracle, although similar things had been done before. Athenæus (Dieipn. iv. cap. 1), states, that at the espousals of Caranus, B. C, 300, nude women appeared who vomited flames. The priestesses of Diana Parasya, in Cappadocia, commanded great veneration by walking on live coals; and the Herpi family annually performed the same miracle in the temple of Apollo, on Mount Soractes, in Etruria, and thereby obtained exemption from military and other duties.

Simplicius, who became pope in 497, then separated from a lady to whom he had been previously married. To prove his superior chastity, however, she was permitted to reside in his palace; but, as this gave rise to some strange reports, she resolved to prove her innocence by the ordeal of fire. For this purpose she chose a solemn day, and in presence of the assembled people carried fire in her hands, and threw it upon the clothes of the pope and herself, without their being in the least damaged. This apparent miracle astonished all that beheld it, and silenced the calumny.

Pachymerus (lib. i, cap. xii), asserts that he saw several accused persons acquit themselves by handling red-hot irons without receiving injury. About 1340, at Dydmotheque, a wife was ordered to submit to this ordeal to clear her character from suspicion. She had previously confessed to the bishop that the charges were well founded; but, by his advice, she consented to lift the red-hot iron, and having carried it three times around a wooden chair, placed it upon the same, when the chair took fire. She was unhurt, and her husband convinced. Catacuzene(iii, cap. 27), relates it as a miracle.

About 1047, Heroid, pretending to be the son of Magnus, king of Norway, was requested to prove his right to the succession by the fiery trial. He submitted to it, and walked with impunity, barefooted, over red-hot iron. Two centuries later, Albertus Magnus described two processes by which a transient incombustibility might be imparted to the body of a man.

At the commencement of the eleventh century, the Deacon Poppeo, desirous to win Sweyn II, king of Denmark, and the Danes, back to Christianity, thrust his hand and arm, bared to the elbow, into an iron gantlet at a white heat, carried it through the assembled Danes, and laid it at the feet of the prince without receiving injury.

In 1065, in a law-suit, a witness was produced who, in the church of Anvers, submitted to the ordeal of boiling water. The water was declared to be heated much beyond the boiling point, which we know is impossible, but the witness confirmed this, and came out unscathed.

In Africa, in the Caffre country, and Loango, some Portuguese travelers saw the accused called on to justify themselves by handling hot iron. Among the Ioloffs, it is a law that, when a man denies a crime imputed to him, a red-hot iron shall be applied to his tongue, and according as the fire affects him he is culpable or innocent; yet all the accused are not condemned.

These instances will show how deep a hold this ordeal had taken on the minds of men. That it affords a grand opportunity to pious frauds, or shameless imposition, cannot be doubted. Men, superior to their time, opposed it for centuries without avail, and even up to within two hundred years, the system of torture to heretics and criminals was in full use in Europe.

In 840, however, Argoband, archbishop of Lyons, pronounced the fire ordeal to be tempting God, and contrary to His law, as well as to the precepts of charity. They had previously been condemned by the council of Worms in 829; and Gregory the Great also prescribed them. In England they were suppressed in the third year of Henry III. (Johnson's English Canons, A. D. 1065). The cold-water ordeal was continued long after those by hot iron and boiling water were abolished, and was the cause of the death of many thousands of innocent victims.

The Belmont County (O.) Coal Field.

A correspondent of the Pittsburgh *Commercial*, writing from Bellaire, Ohio, says: "The geological formations of Belmont county belong to the carboniferous period, and are included within the great Appalachian coal measures of the country. Within the rugged and homely hills of Bellaire lie, above the Ohio River, five distinct beds of coal, and at a distance below the surface of from five hundred to eight hundred feet is another distinct vein, the same as is being now worked at Steubenville. These are not all persistent, but generally have their equivalents. The dip of the strata here is southeastward, and at the rate of thirty feet to the mile, so that a horizontal section in any direction of a few miles discloses great varieties of mineral constituents. In an approximate geological section of the hills in the vicinity of Bellaire, at an estimated hight of five hundred feet from low water of the Ohio River to the summit, is found the following beds of coal: Six feet, bituminous; four feet, bituminous; three and one half feet, bituminous and cannel; five feet, splint; and two feet, bituminous; and then beneath all these is the Steubenville vein, four feet bituminous. The six feet vein, or river coal, is the vein that is now being worked so extensively on the Ohio River and Wheeling and McMahn's creeks, in this county. This is an excellent coal for generating steam and heat. In fact, it is a good coal for all purposes except smelting iron ore, containing so heavy a percentage of sulphur as to render it unfit for use in the blast furnace. It is used extensively on the Central Ohio Railroad, and by steamers on the Ohio River for propelling purposes, throughout the country for domestic purposes, and in the puddling furnaces in the iron mills of Bellaire, Wheeling, Marietta, etc., and in the manufacture of glass in Martin's Ferry, Bellaire, Wheeling, and other points, whilst considerable quantities are constantly being shipped to far distant points in the West. From this vein of coal there is annually, in the Bellaire field, being mined about 5,600,000 bushels, for which there is paid to miners about $140,000. The thickness of this vein renders it convenient to work, and the dip being to the southeast, the mines opened on the west side of the river and above the river drain themselves, an advantage of incalculable value that anyone conversant with the working of coal mines can readily appreciate. This coal is being delivered at the furnaces of our factories at from five to six and one-half cents per bushel, and is selling to steamboats at six cents."

Weight of a Square Foot of Copper, Lead, Brass and Zinc.

FROM 1-16 TO 1 INCH IN THICKNESS.

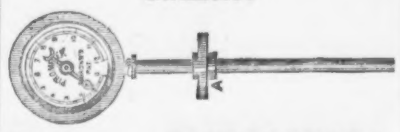
Thickness.	Copper	Lead.	Brass.	Zinc.
Inch.	Lbs.	Lbs.	Lbs.	Lbs.
1-16	2·89	3·691	2·675	2·34
⅛	5·781	7·382	5·35	4·68
3-16	8·672	11·074	8·025	7·02
¼	11·562	14·765	10·7	9 36
5-16	14·453	18·456	13·375	11·7
⅜	17·344	22·148	16·05	14·04
7-16	20·234	25·839	18·725	16·34
½	23·125	29·53	21·4	18·72
9-16	26·016	33·222	24·075	
⅝	28·906	36·913	26·75	
11-16	31·797	40·604	29·425	
¾	34·688	44·296	32·1	
13-16	37·578	47·987		
⅞	40·469	51·678		
15-16	43·359	55·37		
1	46 25	59·061		

The new addition to the Girard Rolling Mill, at Youngstown, Ohio, is 130 feet long, and 46 wide, and contains the machinery for the manufacture of nuts, bolts, washers, car links and pins. The wing of this addition, is 30 by 50 feet, and is used as a machine shop for repairing their own machinery. Still another addition has been commenced, 40 by 80 feet, to contain six puddling furnaces, which will make 16 in all. There are already in use three trains of rolls; also 7 engines—one of 140 horse-power, one of 100, one of 80, and four of 10 horse-power. These works, when in full blast, will make 40 tons of merchant iron per day, one-half of which will be manufactured into nuts, bolts, washers, pins and car links, and will employ 150 men.

A blast of 3000 tons was lately made at the mines of the Tomber Brook Mining Company, in Morris county, N. J. After much delay in the necessary preparations the wires were connected and the signal given for the work of destruction to commence. A few turns of the battery and a dull, heavy thud was heard, and the immense boulders of rock and ore were seen to give way sluggishly and roll in one huge mass at the foot of the quarry. The scene was terrific in the extreme. The air was filled with fragments of rock, and the sickening odor of the evolved gases was almost unbearable. The great work was finished, and there, in the midst of the primeval forest, lay in broken heaps 3000 tons of ore.

PYROMETERS
for BLAST FURNACES.

E. BROWN'S STANDARD PORTABLE,
E. Brown's Improved
Gauntlet

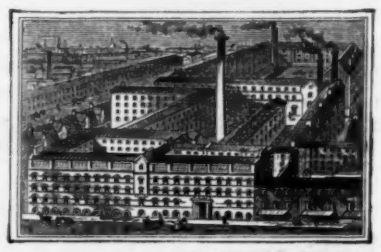


Edw. BROWN,
311 Walnut St., Philadelphia.

ALSO FOR SALE
PYROMETERS
For Baker's Ovens, Boiler Flues, Galvanizing Baths, Oil Stills, Vulcanizers, Superheated Steam.

E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.

Over 300 "Gauntlett" and 100 Portable Pyrometers are now in use at Blast Furnaces.
Circulars on application.



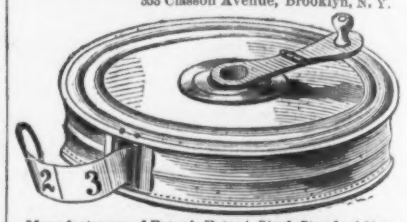
Manufactory of the Spencerian Pens, Birmingham, England.

SWAN QUILL Action!
SPENCERIAN
STEEL PENS.

These Pens are comprised in 15 numbers; of the NUMBER ONE PEN alone we sold more than
5,000,000
In 1873.
and the sale is continually increasing.
They are of superior English make, and are justly celebrated for their elasticity, durability, and evenness of point. *For Sale by the trade generally.*
☞ *To accommodate those who may wish to try these Pens, we will send a Sample Card, containing all of the 15 numbers, by mail on receipt of 25 cents.*
IVISON, BLAKEMAN, TAYLOR & CO.,
138 & 140 Grand Street, N. Y.

wett's Patent
Filter
WITH
PORCELAIN
LINED
COOLER.
Acknowledged the only Complete Filter and Cooler in the world.
Hardware, House-furnishing and Crockery dealers can find no more salable article, as this Filter is perfect in its work of purifying water of every kind, attractive in appearance, &c., &c.
Send for illustrated circular.
MANUFACTURED ONLY BY
JOHN C. JEWETT & SONS, Buffalo N. Y.

GEO. M. EDDY & CO.,
Manufacturers of Measuring Tapes,
353 Classon Avenue, Brooklyn, N. Y.



Manufacturers of Paine's Patent Steel Standard Measuring Tapes, for Surveyors, Engineers and Mechanics requiring a correct measure of great length according to U. S. Standard. Also of Tape measures for the same trades, Lumbermen, Machinists, Tailors, Shoemakers, Dressmakers, &c. Catalogues on application.

Get Binders
FOR THE IRON AGE.

We have made arrangements to furnish Koch's PATENT BINDER, which we think altogether the best before the public, to our subscribers at the following very low rates—about the wholesale prices by the dozen.

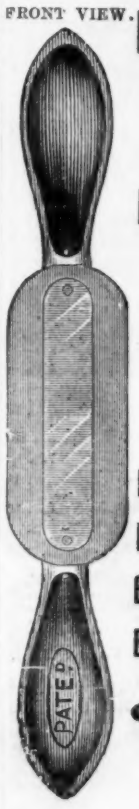
Half Cloth.....$1·00 each.
(Cloth Back and Corners, with Morocco Paper Sides—a good, serviceable Binder.)
Full Cloth.....1·50
(Morocco Cloth Back and Sides.)
Half Roan.....1·75 "
(Roan Back; Cloth Sides.)
Half Morocco.....2·00 "
(Morocco Back and Corners; Cloth Sides.)

The above are all in black, which is the most serviceable color, with the exception of the Half Morocco, which are put up in a number of handsome shades. The name of the paper is stamped in gold on either side, and each Binder is furnished with loops by which it can be hung up against the wall as newspaper files are usually disposed of.

The Binders will each hold the twenty-six numbers in the form of a bound volume. They can be nicely inserted in two or three minutes by any boy of ordinary intelligence; and when the covers are full they can be either preserved in that shape as bound volumes of *The Iron Age*, or they can be emptied and used again. There is no possibility of their getting out of order, unless the cords, which are very strong, wear out, when anyone can easily replace them with a piece of fishing line or other suitable string. Subscribers who value the paper should order them at once, so as to keep the paper in good order

On receipt of the price we will ship them, safely put up, by any express line or to any New York house to be packed. They are too large to be sent by mail.

FRONT VIEW. LLOYD, SUPPLEE & WALTON, BACK VIEW



WHOLESALE
HARDWARE HOUSE,
AND
HARDWARE FACTORS.
BATES' MANUFACTURING CO.'S GOODS.
Bonney's Pat. Hollow Augers & Spoke Trimmers.
Bonney's Patent Double-Edged Spoke Shave.
Bonney's Patent Adjustable Gate Hinge.
Bonney's Patent Sash-Fast and Lamp Bracket.
625 Market Street,
PHILADELPHIA.

HENRY DISSTON & SONS,

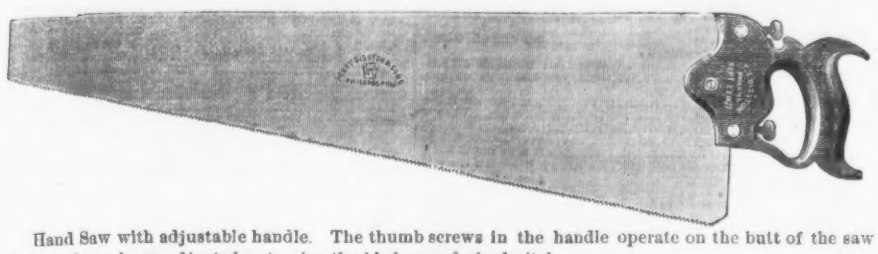
Keystone Saw, Tool, Steel and File Works,

PHILADELPHIA.

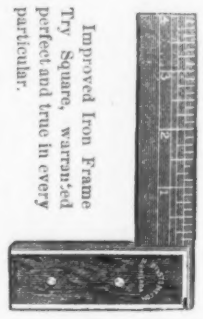
Manufacturers of SHEET STEEL, and all Articles made from Sheet Steel.

SAWS OF EVERY DESCRIPTION.

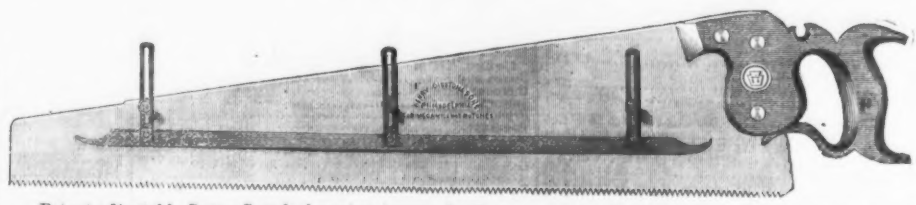
Also, FILES, TOOLS, Etc., and all kinds of Labor Saving Implements for keeping Saws in perfect order.



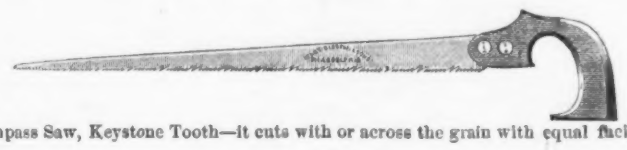
Hand Saw with adjustable handle. The thumb screws in the handle operate on the butt of the saw blade, and can be so adjusted as to give the blade any desired pitch.



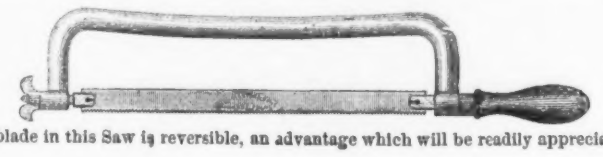
Improved Iron Frame Try Square, warranted perfect and true in every particular.



Patent adjustable Gauge Saw for sawing tenons, kerfing, or any work where the cut is required to be of definite depth. Will pay for itself in one day. Try it and be convinced. Remove the gauge and use as an ordinary saw.



Compass Saw, Keystone Tooth—it cuts with or across the grain with equal facility.



Hack Saw. The blade in this Saw is reversible, an advantage which will be readily appreciated by mechanics.

READ, MARK, LEARN.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

The test of practical experience has been ap-

plied, the verdict given, the fiat has gone forth, and the Humbugs are fast fizzling out, while our rapidly increasing sales testify to the esti-

mation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

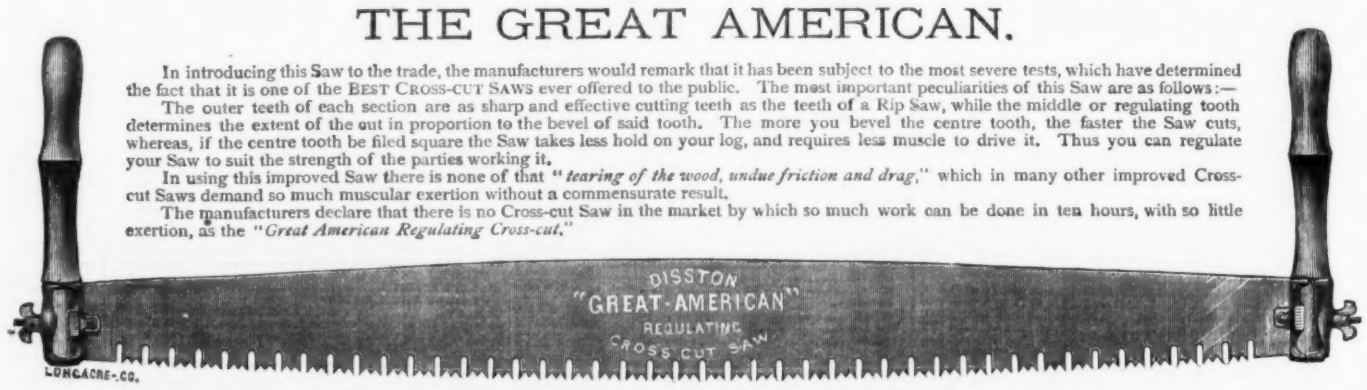
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag,*" which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

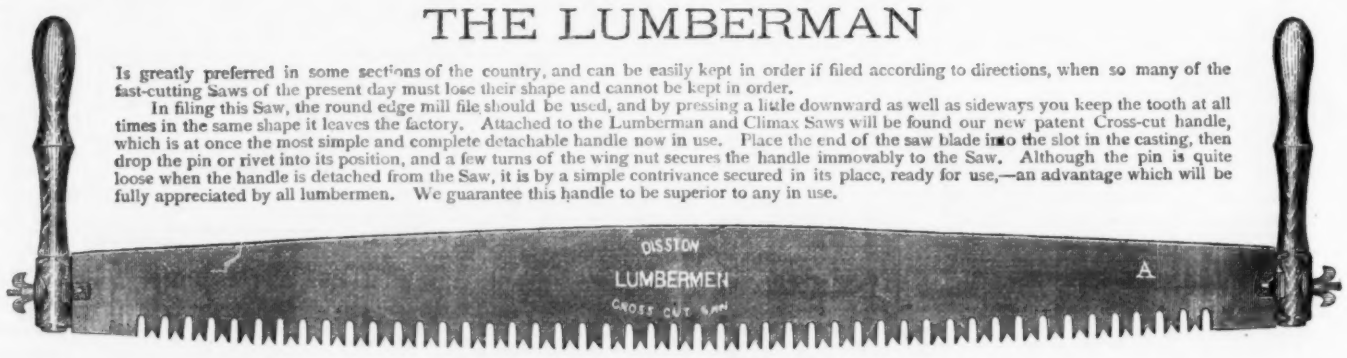
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

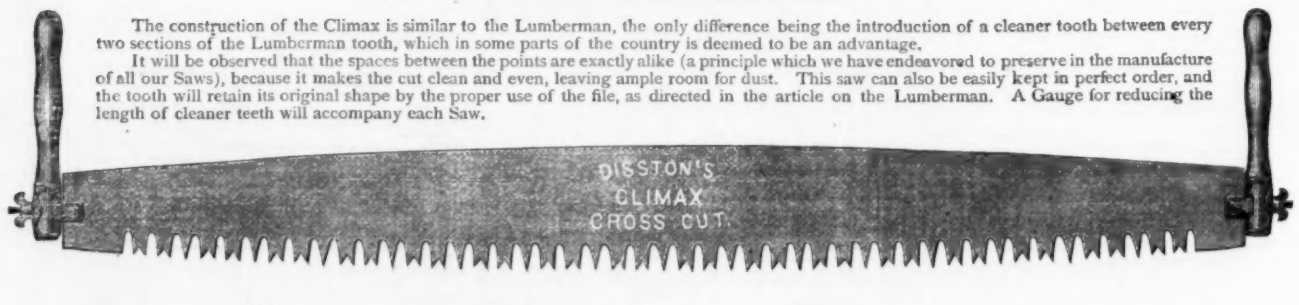
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

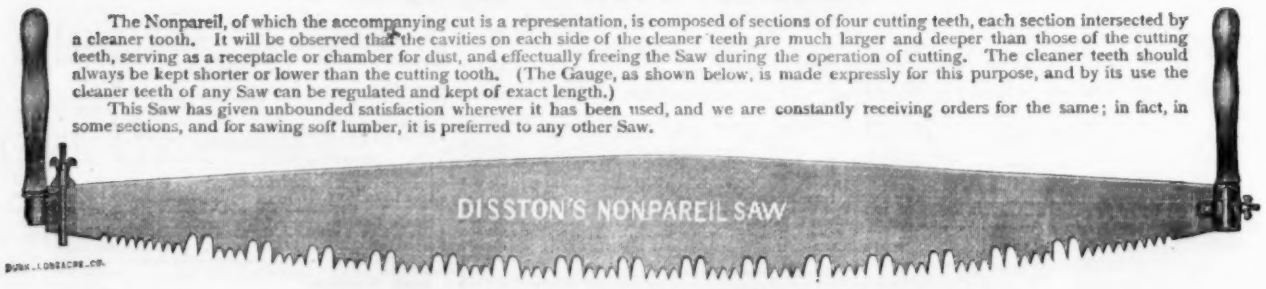
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



Plain Truths for Practical Men.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

The test of practical experience has been ap-

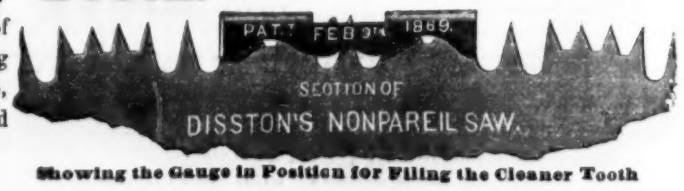
plied, the verdict given, the fiat has gone forth, and the Humbugs are fast fizzling out, while our rapidly increasing sales testify to the es-

timation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

Gauge for Regulating Cleaning Teeth.

The cleaning teeth of all saws should be somewhat shorter than the cutting teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the cutting teeth, the cleaning teeth projecting through the opening in centre of Gauge. Reduce the projecting points, by means of a file, until arrested by the edges of the Gauge, which is made of hardened steel. Thus tooth after tooth can be rapidly and correctly reduced to an even length by any unskilled operator



Showing the Gauge in Position for Filing the Cleaner Tooth

New York Wholesale Prices, September 2, 1874.

HARDWARE.

Anvils.
Solid Cast Steel.....₩ ℔ 14c
Wright's.....₩ ℔ gold 12c; over 250 ℔s 13½c, gold
Armitage's Mouse Hole.....gold 11c
Wilkinson's.....₩ ℔ gold 11½c
Eagle Anvils, ₩ ℔ 11c currency.....dis

Apple Parers.
Domestic
Corn Table
Lightning
Hudson's
Reading
Union
Skeleton Paring, Coring and Slicing.....$15 00 dis 5 %
Bay State, Paring, Coring and Slicing.....8 00
Cliff ax Slicer.....$11 00 @ 11 50
Bay State Peach Parer.....11 00 @ 11 50
Lightning " " 7 00
Peach Stoner and Halver

Augers and Bits.
Snell Mfg. Co.....dis 15 @ 20 %
Russell Jennings.....dis 10 %
Douglass Mfg. Co., Extra.....25&10&10 %
" " No. 1.....25, 10, 10&5 %
" " Hollow Augers.....25&10 %
Cushman's Expanding Hollow Augers.....dis 20 %
Ives' Augers and Bits.....dis 40 %
" Gouge Lip Augers and Bits.....dis 30&10 %
" Hollow Augers.....dis 25&10 %
" Expansive Hollow Augers.....dis 40 %
" Expansive Bits.....dis 20&10 %
Andrews' Bits.....dis 25 %
Clark's Expansive Bits.....dis 15 %
Cook's Patent Augers.....dis 50 %
" " Bits.....dis 40&10 %
Shepardson's Double Cut Bits.....dis 20 %
Griswold's Patent.....dis 20 %
CastSteel Cut Augers.....dis 37½&10 %
" Auger Bits.....dis 37½&10 %
Gimlet Bits.....dis 10&10 %
Long Augers.....new list dis 30 %
Bonney's Patent Hollow.....$48 per doz—dis 25 %
Stearns' " .....$48 per doz—dis 25 %
Morse's Bit Stock Drills.....dis 20 %
Nobles Mfg. Co. C. S. Cut Augers.....dis 30&10 %
L'Hommedieu's ship Augers.....dis 15 %
Watrous Ship Augers.....dis 15 %
Vaughan's Post Hole—
6 in. $23 60; 9 in. $25 per doz.....dis 20 %

Awls and Tools.
Aiken's.....dis 30&10 %
Nos. 42 and 43.....

Axes.
Brook's.....per doz $12 00 @ 14 00 net
Gloucs.....per doz $12 50 @ 14 00
Hunt's.....₩ doz $14 00 @ 19 00 dis 5&5&5 % cash
Collins'.....₩ doz 11 00 @ 15 50 net @ dis 5 %
Hurd's.....₩ doz 12 50 @ 13 50
Schweltzer Mfg. Co.'s.....₩ doz 13 00 @ 15 00
Simmons'.....₩ doz 12 50 @ 14 00
Morris'.....₩ doz 12 50 @ 13 50
Red Jacket.....₩ doz 12 00 @ 12 50
Mann's.....₩ doz 11 50 @ 13 00
" Double Bitted.....₩ doz 21 50 @ 22 00
Lowell Tool Co., "Peerless".....₩ doz 13 00 @ 14 50
Conerhill's.....₩ doz 12 00 @ 13 00
" Crown.....₩ doz 12 50 @ 18 50
John Leverett's.....₩ doz 12 50 @ 15 50
Nobles Mfg. Co. S. B.....₩ doz 12 50 @ 13 00
" D. B.....₩ doz 22 00 @ 23 00
Ten Eyck.....₩ doz $11 00 @ 12 50 net

Balances.
Chatillon's
Frary's
Morton's
} new list dis 15 %

Bands.
Plated.....new list dis 50&5 %
Iron Rim.....new list dis 25&5 %
Brass (Plated list).....new list dis 50, 10&5 %
Grolde.....new list dis 50&5 %

Bells.
Hand, Light Brass.....dis 66⅔&10 %
Hand Ex. Heavy.....dis 40&10 %
White Metal.....dis 50&10 %
Sheep.....dis 25 %
wiss.....dis 50 %
Globe.....dis 15&10 %
Abbe's.....dis 15&10 %
Taylor's Patent Door.....dis 25 %
Western Gong.....dis 25 %
Brook's Crank.....revised list dis 50 %
" Pull.....revised list dis 50 %
Hart Mfg. Co., Crank and Pull.....dis 50&10 %
Cow -Common Wrought.....dis 20&10 %
" Western.....new list dis 20&10 %
" Kentucky "Star".....new list dis 20&10 %
" Dodge's Genuine Kentucky.....new list dis 35 %
" Yaw's Genuine.....dis 30 %
" Texas.....dis 35 %
Call.....dis 15 %

Bellows.
Blacksmiths'.....dis 20 %
Moulders'.....dis 15 %
Hand Bellows.....dis 10 %

Blind Fasteners.
Mackrell's.....dis 30 %
Van Sand's.....₩ gross $14 00
Washburn's Patent.....₩ gross 14 00
Merriman's.....new list net

Blind Staples.
Boardman's Patent, ½ in. and larger.....₩ ℔ 57 c
" ⅜ in....." 42 c
100 ℔ lots 1c. ₩ ℔ from list.

Bolts.
Carriage and Tire, Ætna Nut Co.....dis 60 %
Stove, Ætna Nut Co.....dis 10&5 %
Cast Iron Barrel, Shutter, &c.....new list dis 60, 10&10 %
Wrought Iron Barrel.....new list dis 50, 10&10 %
" " Square.....new list dis 50, 10&10 %
Wrought Iron Flush.....dis 25 %
Carriage and Tire, Common.....dis 75c&10 %
" " " Norway Iron.....75&10 %
Star, Philadelphia.....dis 50 @ 50&10 %
Eagle, Philadelphia.....dis 50 @ 50&10 %
Philadelphia Pattern, P. S. & W.....dis 50&10 %
Tire, Bessemer Steel, Hubbard & Curtiss.....dis 50 %
Carriage and Tire, R. B. & W.....old list dis 50&5 %
Plow, R. B. & W.....dis 30 %
Stove, R. B. & W.....dis 10 %
" Shelton Co. Shaved Heads.....dis 15 %
Union Nut Co., old list.....dis 50&2&2&5 %
" " Stove.....dis 15 %
Machine.....dis 40 @ 45 %

Borax.
₩ ℔ 18c

Boring Machines.
Kellogg's.....dis 15 %
Knell Mfg. Co., Rice's Patent.....dis 15 %
" " Regular.....dis 15 %
Douglas Mfg. Co.....dis 20&10 %
Mortising Machines each.....$18 00

Bow Pins.—Union Nut Co., new list ..dis 50&10&5 %

Braces.
Hildreth's Patent.....di 40, 10&5 %
Barber's Patent.....dis 40&5 %
C. S. Backus.....dis 40&10 %
Wilson Mfg. Co.....new list dis 10 %
Spofford's Patent.....dis 40&5 %
Noble's Patent.....dis 40&5 %
Bartholomew's American Ball.....dis 10&10 %
" Patent Grip.....dis 40 %
Ives' Novelty.....dis 40&5 %

Brackets.
Shelf.....dis 60&10 %

Bull Rings.—Union Nut Co., new list..dis 50&10&5 %

Bung Hole Borers.
Common and Ring.....dis 25 %
Enterprise Mfg. Co.....dis 20&10 %
Ives' Tap Borers.....dis 25 %

Butchers' Cleavers.
Humason & Bukley Mfg. Co.....dis 20&10 %
Bradley's.....dis 25 %
Beatty's.....new list dis 20 %

2	3	4	5	6	7	8	9
$19 00	$21 50	$24 00	$27 00	$30 00	$33 50	$36 50	$40 00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4	5	6
$23 25	$29 75	$30 25	$38 75	$43 55	$48 50	$54 00

Butts.
Wrought Brass.....new list dis 30 %
Cast Fast Joint, Narrow.....dis 50&5 %
" " Broad.....dis 50&5 %
Cast Loose Joint.....dis 60&5 %
" " Mayer.....dis 50&5 %
" " Parliament.....dis 50&5 %
Drilled Wire Jointed—
Narrow.....dis 50&10 %
Broad.....dis 50 %
Loose Joint.....dis 60 %
Mayer's.....dis 50 %
Parliament.....dis 50 %
Loose Pin.....dis 5&10 %
Wrought Fast Joint, Narrow.....dis 30 %
Wrought Broad.....dis 35 %
" Loose Joint.....dis 35 %
Wrought Table and Back Flaps.....dis 5 %
Lull & Porter's Blind Butts.....dis 10 %
Palmer Blind Butts.....dis 30&10 %
Nicholson Blind Butts.....dis 40&10 %
Parker's Blind Butts.....dis 50&5 %
Huffer's Blind Butts.....dis 30&10 %
A. S. Parker's.....dis 40&10 %
Clark's Surface Blind Hinges, Nos. 1, and 3.....dis 50&5 %
" " " No. 20.....dis 5&5 %
" Mortise " No. 2, 4, 4½, 5, 6, 8, 10.....dis 35 %
Seymour's.....dis 50&5 %
Shepard's.....dis 5&5 %
Garretson's....No. 1, dis 5&10 %; Nos. 2 and 7 dis 50&5 %
The American Spiral Spring Butt Co.....dis 20 %
Standard.....dis 50&5 %

Caps—Percussion, per 1000.
G. D.....37c
Ely's E. B.....1-4s, 55c.; 1-10s, 65c., gold
" Double Waterproof, 1-4s, $1 45; 1-10s, $1 52½c., gold
Colt's.....1-10s 70c., gold

Carpet Sweepers.
Union.....each $2 75 net
Welcome.....each 2 75 net

Cartridges.
Metallic.....dis 50 @ 50&10 %
Cards.—Horse and Curry.....dis 30&10 %
Cotton.....new list dis 10&10 %
Wool.....new list dis 10&10 %

Carpet Stretchers.
P. S. & W.....per doz $2 00; dis 33⅓ %

Cast Iron.
Bed.....dis 33⅓&10 %
Plate.....dis 40&10 %
Sewing Machine.....dis 70&10 %

Cattle Leaders.....new list dis 60&10 %

Chain
Engnish Coil.....net gold

₩ ℔	.13	9¾	9	8½	8¼	8c
	8-16	¼	5-16	⅜	7-16	½

Trace, 6½-10-2.....by the cask, ₩ pair, gold, 58c
Trace, 7-10-2.....by the cask, ₩ pair gold, 63c
Galvanized Pump Chain.....₩ ℔ 14c
German Halter Chain.....new list, Jan. 1, dis 15 %
German Coil.....new list, Jan. 1, dis 15 %
Jack Chain, Iron.....dis 50 %
" Brass.....dis 40 %

Chalk.
White.....₩ gross, 50c
Red.....₩ gross, 75c
Blue.....₩ gross, 90c
Crayons.....₩ gross, 14c

Cherry Stoners.
Family.....₩ doz $8 50

Chisels.
Socket Firmers.....dis 60&10 %
Socket Framing.....dis 60&10 %
Socket Corner.....dis 60&10 %
Tanged Firmers.....dis 45&10 %
Butcher's.....$5 50 to £ gold—new list
Newhouse's.....$5 50 to £ gold
Spear & Jackson's.....$5 50 to £ gold—new list

Clamps.
Cabinet.....dis 60&10 %
Judd's.....dis 45&10 %
Lambert's.....dis 20 %
Providence Tool Co.....dis 10 %

Clips, Axle.
Norway or Best.....dis 30 %
Superior.....dis 50 %
"Star," Superior Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₩ doz, $ 85 @ 1 25
Wooden Handled.....₩ doz, 1 00 @ 2 00

Coal Hods.—Smith, Burns & Co.....dis 15 @ 25 %

	14	15	16	17	18	incn.
Japanned	$6 00	6 25	6 75	7 50	8 00	per doz.
Galvanized	9 50	10 09	10 75	11 50	12 50	"

Morning Glory Funnel Hods—

	No.	15	16	17	
Japanned		$9 00	10 50	12 00	per doz
Galvanized		13 00	14 50	16 00	"

Cockeyes.
Cocks.....dis 30 %

Cocks.
Brass Racking.....dis 20&10 %
Lock and Globe.....dis 2&10 %

Coffee Mills.
Board and Box.....dis 15 %
Increase Wilson's.....new list dis 15 %
Selsor's Pat.....$9 50, $10 50—dis 25 %
French Steel.....dis 25 %
The Swift.....dis 20 %
" American".....dis 20 %
Enterprise Mfg. Co.....dis 20&10 %
Diamond, per doz $4 00.....dis 10 %

Compasses and Dividers.
Bemis.....dis 35 %
Cook's.....dis 15 %
Excensior.....dis 30 %
Peck Stow & Wilcox.....dis 25 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 20 @ 25 %
Swan & Brombacher.....dis 15 @ 20 %

Corkscrews.
.....dis 25 %

Corn Knives and Cutters.
Bradley's.....dis 10 %

Croquet.—Phineas Smith.....dis 40&10

Crow Bars.
Cast Steel.....₩ ℔ 11c. net
Iron, steel points.....₩ ℔ 6½c

Crucibles.
Gautier & Co.....₩ No. 5½c
Curling Irons.....dis 20&10 %

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass.....dis 25 %
Fitch's.....dis 15&10 %
Rubber.....₩ doz, $9 00—dis 15 %
Schweitzer Mfg. Co.....dis 20 %
The Lawrence Curry Comb Co.....dis 20 %

Curtain Pins.
Silvered Glass.....old list dis 45&10 %

Cutlery.
American Table.....net list
American Pocket.....dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co.....dis 20&10 %

Dippers.
Britannia.....per doz 7 50—dis 20 %
Cocoa, Plain.....per doz $3 25—dis 20 %
" Rimmed.....per doz 3 75—dis 20 %

Dog Collars.
Embossed Gilt.....dis 20 %
Leather.....dis 20 %

Door Springs.
Gray's.....$7 50 ₩ doz—dis 50 %
Torrey's Patent.....$7 50 ₩ doz—dis 50 %
Palmer's Japanned No. 6.....₩ doz $5 00
" Copppered " 6 00
" Silvered " 8 00
Challenge.—
Japanned.....₩ doz $4 00 @ 6 00
Bronzed.....₩ doz 5 00 @ 7 00
Nickel Plated.....₩ doz 6 50 @ 9 00
1 Gross lots.....dis 10 %
5 Gross lots.....dis 20 %

Drawing Knives......dis 60 @ 60&10 %
Bradley's.....dis 25 %
Adjustable Handled.....dis 10 %

Drills.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %
Whitney's Ratchet.....dis 20 %
Blacksmiths'.....each $7 20—dis 60&10 %

Drill Chucks.
The Danbury.....each 10 00—dis 25 @ 30 %

Drug Mills.
American Drug Mills.....dis 20 %

Egg Beaters.
Monroe's.....8 in. 10 in.
Per doz $8 00 9 00.....dis 10 %
Dover.....₩ doz net $6 00
National.....₩ doz $4 50—dis 20 %
Peerless.....₩ doz $4 00—dis 10 %

Emery.
Genuine Chester—Regular Nos.....₩ ℔ 7c } dis 5 @ 10 %
" Flour and FF.....₩ ℔ 4c }
Washington Mills—Regular Nos.....₩ ℔ 8c
" Flour.....₩ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 35 %
Sauce Pans.....dis 25 %
Glue Kettles.....dis 20 %
Tinned Saucepans.....dis 25 %

Escutcheons.
Brass Thread.....dis 60&10 %
Wood.....dis 25 %

Faucets.
Cork Lined, Wood.....dis 60 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 15&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic.....dis 40 %

Feilue Plates......₩ ℔ 14c; dis 10 %

Files.
American File Co.....$5 00 to £ curreney—dis 10 %
Nicholson.....$5 00 to £ currency—dis 12½ %
Newbould's.....5 25 to £ gold
J. & Riley Carr's Files and Rasps.....5 50 to £ gold
Stubs'.....$ 50 @ 9 00 to £ gold
Butcher's.....5 50 to £ gold
Walter Spencer & Co.'s "Diamond".....5 25 to £ gold
Spear & Jackson's.....5 00 to £ gold
Hargreaves, Smith & Co.'s.....5 00 to £ gold
Jowitt's.....5 25 to £ gold
"Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 25 to £ gold
R. Ibbotson.....5 00 to £ gold
Beam & Murray, "Cyclops".....4 85 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.).....5 00 to £ gold
" Horse Rasps.....5 50 to £ gold
"Philo Sheffield," P. T. Co.....5 00 to £ gold

Floral Tools......dis 25 %
Mrs. Coles, 7 inch rolls.....6 50
" " 5 " 5 50
Knox, with 4-inch Rolls.....5 00 each dis 12½ %
" " 6 " .....6 00 each dis 12½ %
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....4 75 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4½-inch Roll.....5 50 each net
" 6-inch Roll.....6 00 each net
Myers' Fashion Fluter, 4½ inch Rolls.....3 00 each net
" Convex Brass Fluter, Sad Iron attachment..$1 75
Domestic Fluter.....$1 75 each net
Fairy, Self-Heater.....3 00 each net
Geneva Hand Fluter.....$15 00 per doz net
Champion, 6 inch rolls.....6 00 each dis 10 %
" 4 inch rolls.....$2 00 each dis 10 %

Fluting Scissors.....dis 20&10 %

Forges.
Keystone Portable Forge Co.'s.....dis 20 %
"Empire" (W. P. Kellogg & Co.).....dis 20 %

Forks.
Hay, Manure & Spading.....dis 25 %
Plated A 1.....dis 40, 10&5 %

Freezers.
Champion.....dis 33⅓
Torrey's.....dis 50 %

Fry Pans.—P. S. & W.
Tinned.....dis 30 %

₩ doz.	$3 00	3 25	3 62	4 00	4 50	5 00	5 50	6 00	7 50
No.	0	1	2	3	4	5	6	7	8

Smith, Burns & Co., "Excelsior" Polished.....dis 35 %

₩ doz	$3 70	4 00	4 70	5 50	6 00	7 00	8 00	9 00
No.	1	2	3	4	5	6	7	8

Gas Stoves.
Tuft & Howard.....dis 20 %

Gauges.
Marking.....dis 45&10 %
Wire.....dis 10 %

Grind Stones.
J. F. Green & Bro.....dis 20 %

Grind Stone Fixtures.....dis 50&10 %

Hammers.
Emmet Hammer Co.....dis 25 %
Humason & Beckley Mfg. Co.....dis 16⅔&10 %
Maydole's, new list.....dis 5 %
Cheney's.....new list net
Verree.....dis 5 %
Yerks & Plumb.....new advanced list dis 12½ %
Minot & Co.....dis 15 %
Magnetic Tack.....dis 20&10 %
Warner's.....list net

Hand Cuffs and Leg Irons.
Towet's.....dis 25 %

Handles.
Wrought Chest.....dis 60&10 %
Flush Chest.....dis 60&10 %
Lifting.....dis 60&10 %
Coffin.....dis 50&10 %
Saw and Plane.....dis 30&10 %
Hammer and Hatchet.....dis 10 %
Quakertown, Axe, Pick and Sledge.....dis 10 %
" Hammer and Hatchet.....net
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %
Brad Awl.....per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td " 5 25—dis 10&10 %
" " " large " 6 25—dis 10&10 %
Apple " " ass'td " 6 00—dis 10&10 %
" " " large " 7 00—dis 10&10 %
Socket " " ass'td " 3 50—dis 10&10 %
" Framing " " " 6 00—dis 10&10 %
Ffle " " " 3 50—dis 10&10 %
Auger " " " 5 50—dis 10&10 %
" large " 6 50—dis 10&10 %

Hangers.
Barn Door.....dis 65&10 %
"Anti-Friction" (Rider, Wooster & Co.).....dis 30 %
Novelty.....dis 30 %

Harness Snaps.
Henshaw's.....dis 25&10 %
Judd's.....dis 40 %
Fitch's.....dis 30 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....new list dis 50&10 %

Hatchets.—Isaiah Blood.....dis 10 %

Shingling, Nos.	1	2	3	
	₩ doz	$7 50	8 00	8 50
Claw,	₩ doz	8 50	9 00	9 50
Lathing,	₩ doz	7 50	8 00	8 50

Hunt's.....dis 10 %

Shingling, Nos.	1	2	3	
	₩ doz	$7 25	8 00	8 75
Claw,	₩ doz	7 75	8 50	9 25
Lathing,	₩ doz	7 50	8 25	9 00

Hurd's.....dis 30 %

Shingling, Nos.	1	2	3	
	₩ doz	$8 00	8 50	9 00
Claw,	₩ doz	9 00	9 50	10 00
Lathing,	₩ doz	8 00	8 50	9 00

Newark's Edge Tool Co.'s.....dis 25 %

Shingling, Nos.	1	2	3	
	₩ doz	$6 50	7 00	7 50
Claw,	₩ doz	7 25	7 75	8 25
Lathing,	₩ doz	6 50	7 00	7 50

Yerks & Plumb.....dis 12½ %

Shingling, Nos.	1	2	3	
	₩ doz	$7 00	7 50	8 00
Claw,	₩ doz	7 50	8 00	8 50
Lathing,	₩ doz	7 00	7 50	8 00

Simmon's.....dis 15 %

Shingling, Nos.	0 1 2 3..	₩ doz	$7 50	8 00	8 50
Claw,	" 1 2 3..	₩ doz		9 00	9 50
Lathing,	" 1 2 3..	₩ doz		8 00	8 50
Broad,	" 1 2 3..	₩ doz		9 00	10 00
	" 4 5 6..	₩ doz		14 00	16 00
	" 7 8..	₩ doz		20 00	22 00
Elephant					
Shingling, Nos.	1 2 3..	₩ doz	$8 00	8 50	9 00
Claw,	" 1 2 3..	₩ doz	9 00	9 50	10 00
Lathing,	" 1 2 3..	₩ doz	8 00	8 50	9 00

J. P. Verree & Co.....dis 5 %

Shingling, Nos.	1	2	3	
	₩ doz	$7 00	7 50	8 00
Claw,	₩ doz	7 50	8 00	8 50
Lathing,	₩ doz	7 00	7 50	8 00

Underhill's.....dis 10 %

Shingling, Nos.	1	2	3	
	₩ doz	7 25	8 00	8 75
Claw,	₩ doz	7 75	8 50	9 25
Lathing,	₩ doz	12 00	11 00	13 00

Hinges.
Gate, Western.....₩ doz $6 25—dis 60&10 %
" N. E.....₩ doz 11 25—dis 60&10 %
" N. Y. State.....₩ doz 6 25—dis 60&10 %
Rolled Plate.....dis 65&10 %
" Raised.....dis 65&10 %
Wrought Strap and T.....dis 20&10 %
Providence Plate. {6 and 8 in. list 11c. / over 8 in. list 9½c.}.....dis 25&10 %
Screw Hook and Strap.....{8, 10, 12 in. 7½c / 14 to 36 in. 5½c}.....net
Heavy Welded Hook.....{8 to 12 in., 9c / 14 in & up, 8½c}.....dis 10 %
Screw Hook and Eye.....{⅝ to 1 in., 9½c / ⅝ in. 10½c / ⅜ in. 12½c}.....net

Hoes.
Solid Shank, C. S.....₩ doz $8 00—dis 30 %
Socket.....₩ doz 9 00—dis 30 %
Riveted Eye.....₩ doz 5 00—dis 30 %
Grub.....dis 20 %
Planters'—Winsted.....add 10 %
Scovill.....add 33⅓ %
Scovill Pattern (Winsted).....add 20 %

Hooks.
Harness.....dis 60, 10&5 %
Bird Cage.....dis 70&10 %
Cotton.....dis 10 %
Belt.....dis 50&10 %
Clothes Line.....dis 60&10 %
Bench—Skinner's.....per doz $8 00, dis 30&10 %
Bench—Hotchkiss' $5 00 ₩ doz.....dis 10 %
Bench—Weston's No. 1, $8 00; No. 2, $7 00 per doz net
" —McGill's.....$3 00 per doz, dis 10 %
Wardrobe, Japanned.....new list dis 60, 10&10 %
Hat and Coat " .....new list dis 60, 10&10 %
Wrought Staples and Hooks and Staples.....dis 70&10 %
Screw Hooks and Eyes, revised list.....dis 70&10 %
Grass.....dis 2 %
Whiffletree—Patent.....dis 30 %
Hooks and Eyes—Malleable Iron.....dis 55 %
" Brass.....dis 55 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 200 lbs. dis. 5 %.
Ausable Horse Nail Co.

No.	5	6	7	8	9	10
Ausable	30c	27c	25c	24c	23c	22c
Pointed and Polished	31c	28c	26c	25c	24c	23c
Pointed and Blued	32c	29c	27c	26c	25c	24c

In lots of 1000 lbs., 5% discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	22c	21c	20c	20c	19c	20c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., dis 5 %.
Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished).

No.	5	6	7	8	9	10
Patent Finish	28	25	23	22	21	20
Extra "	30	27	25	24	23	22

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	33c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 7½ % discount.
New London Horse Nails.

No.	5	6	7	8	9	10
Great Western	31c	25c	24c	23c	22c	
U B	29c	27c	26c	25c	24c	

In lots of 1000 lbs., dis 5 %.
Star Brand.....₩ ℔ 16c
Morgan.....14c

Horse Shoes.
Burden.....₩ keg, $5 85
R. I. Horse Shoe Co., Perkins Pattern.....₩ keg, 5 85
" " " R. I. Pattern.....₩ keg, 6 85
Mule Shoes.....

Ice Picks.
Iron.....₩ gross $12 00 @ $16 00 net
White's.....per doz $2 50 dis 10 %
W. H.....per doz 1 00 dis 10 %
Dunlap's.....per doz 3 00 net

Kettles.
Brass.....₩ ℔ 55c net
In lots of 500 ℔s.....₩ ℔ 50c net

Knives.
Ames' Butcher Knives.....dis 20 %
" Shoe " .....dis 15 %
Hay and Straw, "Wadsworth's".....dis 20 %

Knobs.
Carriage.....dis 60&10 %
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End.....reduced list dis 10&10 %

Ladles.
Melting.....dis 20 %

Lanterns.
Peerless.....dis 10 %
Brady's Patent.....dis 10 %
Ætna.....dis 10 %
Yankee.....dis 10 %
De Beque.....dis 10 %

Lemon Squeezers.
Porcelain Lined.....per doz $7 00, dis 10 %

Lines.
Linen Fish.....dis 10&10 %
Cotton Chalk.....dis 40 %
Silver Lake Chalk.....dis 10&10 %
Mason's.....dis 10&10 %
Galvanized Wire Clothes.....per doz 9 00 net

Locks and Latches.
Cabinet—Eagle.....dis 25 %
Cabinet—Gaylord.....dis 25 %
Langstroth & Crane.....dis 40 %
Trunk.....dis 10 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Scandinavian Jail.....dis 10 %
American Lock Co.....dis 33⅓ %
Plate.....dis 25 %
Pad.....new list dis 50, and 2 % for cash
Barnes & Deitz.....dis 25 %
Yale Lock Co.....dis 40 %
Sargent & Greenleaf.....dis 20 %
Trenton Lock Co.....
Branford.....
Norwich.....
Russell & Erwin.....
Norwalk.....
Nashua.....
Mallory, Wheeler & Co.....
P. & F. Corbin.....
Parker & Whipple.....
Jacobus & Nimick Mfg. Co.....
} New list dis 45 %, 2 % extra for cash.

Mallets.
Hickory and Lignumvitæ.....dis 20 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 10 %

No.	1	2	3	4
₩ doz.	$14 00	$17 00	$19 00	$30 00

Hales'.....dis 25 %

No.	11	12	13
₩ doz.	$37 00	$33 00	$42 00

Miles Challenge.....dis 20 %

No.	1	2	3
₩ doz.	$32 00	$30 00	$40 00

Perry's Champion (P. S. & W.).....dis 10 %

No.	300	300	400
₩ doz.	$22 00	$27 00	$40 00

Woodruff's (P. S. & W.).....dis 10 %

No.	100	150
₩ doz.	$15 00	$18 00

American.....dis 25 @ 25&5 %

No.	1	2	2½	3	4	B	5
Each	$6 00	$9 00	$12 00	$15 00	$30 00	$60 00	$75 00

Molasses Gates.
Stebbins' Pattern.....dis 60&10 %
Tinned ends.....dis 40&10 %
Patent Self-Measuring.....per doz $42 00—dis 20&10 %
Bush's.....dis 20 %
Lincoln's.....dis 50&10 %

Mortars and Pestles.
Iron.....net

Mouse Traps.
Wood Choker.....₩ doz holes, 16 @ 18c
Round, Wire.....₩ doz 2 00 to 2 50 net
Square, " .....₩ doz 2 00 to 2 50 net
Cage.....₩ doz 2 50, dis 10 %

Mowers, Lawn.
Excelsior.....dis 25 %

Nails......10d $3 75 @ 3 90

Nail Pullers.
Capewell's Giant.....per doz $30 00 net

Nuts and Washers.
Nuts.....large, 6c; small, 8c off list.
Washers.....large, 8c; small, 10c off list.

Oil Stones.
Washita No. 1.....₩ ℔ 22c
Washita Slips.....₩ ℔ 45c
Washita No. 2.....₩ ℔ 17c
Arkansas.....₩ ℔ 1 25
Hindostan.....₩ ℔ 6c dis 10&10 %
" Slips.....₩ ℔ 10c dis 10&10 %

Oilers.
Miller's Zinc.....dis 30 %
" Brass and Copper.....dis 25 %
Olmsted's.....new list dis 25&10 %
Broughton's.....dis 25&5 %
Malleable.....per doz $5 00 dis 10 %
Common Tin.....dis 30 %
" Zinc.....dis 30 %
" Brass and Copper.....dis 30 %
Prior's.....dis 30&10 %

Ox Shoes.
Concave.....₩ ℔ 13c net
Ox Bells.....dis 60&10 %

Pencils
Rope's Carpenters'.....dis 30&10 %
Dixon's Lead.....₩ gross $4 50 net
" Lumber.....₩ gross 9 00 net

Picture Nails and Knobs.
Brass Head.....dis 60&10 %
Richards' Patent.....dis 40 @ 40&10 %
Judd's.....dis 60&10 %

Pinking Irons......per doz $2 75—dis 60&10 %

Planes.
Auburn Tool Co.'s.....dis 30&10 %
Ensenore, Bench.....dis 50 %
Chapin s, 1st quality.....dis 25&10 %
Chapin's 2d quality.....dis 33⅓&10 %
Greenneld Tool Co.....dis 25&10 %
"New York".....dis 40 %
Sandusky Tool Co., 1st quality.....dis 35 %
" " 2d " (Ogonta).....dis 50 %
Ohio Tool Co., 1st quality.....dis 35 %
" " 2d quality (Scioto).....dis 40 %
Owasco Tool Co., 1st quality.....dis 35&10 %
" " 2d quality.....dis 50 %
Howland's, 1st quality.....dis 30&10 %
Bailey's Patent Adjustable.....dis 20&10 %
Plane Irons, Butcher's.....$5 50 to £ gold—new list
" Auburn Tool Co.'s.....dis 25 %
" Chapin's.....dis 10&10 %
" Greenfield Tool Co.....net list
" Ohio Tool Co.....dis 10 %
" Spear & Jackson's.....5 50 to £ gold—new list
" Sandusky Tool Co.....dis 10 %
Plow Bits, Greenfield Tool Co.....dis 10 %

Pliers.
Button's Patent.....dis 33⅓ %

Plumbs and Levels.
Chapin's.....dis 66⅔&10 %
Standard

Wringers.	
Providence	₩ doz $18 00
Universal—Extra	₩ doz 58 00
Novelty	₩ doz 58 00
Sherman	₩ doz 58 00
Reliance	₩ doz 58 00
Monitor	₩ doz 58 00
King	₩ doz 58 00
Crown	₩ doz 58 00
Eureka	₩ doz 58 00
Independent	₩ doz 58 00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 5 @ 10 %.

COMMON STAMPED WARE, &c.

Bucket Covers.

	½	1	2	3	4
Quarts	4½	5 5-16	6 5-16	6¾	7 11-16
Inch					
Per gross	$2·00	2·60	3·40	4·25	5·75
	6	8	10	12	
Quarts	8¾	9¾	9¾	10 9-16	
Inch					
Per gross	$7·00	8·00	8·50	11·50	

Cake Box Covers.

	Small.	Medium.	Large.
Inch	11¾	12¼	13½
Per gross	$15·00	18·00	22·00

Pot Covers.

Inch	7¾	8¼	8¾	9¼	9¾	10¼
Per gross	$5·75	6·00	6·25	6·75	7·25	8·25
Inch	10¾	11¾	11¾	12¾	12¾	13¼
Per gross	$8·75	9·50	10·00	13·00	13·75	16·50

Pie, Dinner or Scolloped Plates.

Inch	6	7	8	9	10	11
Per gross	$4·00	4·50	6·00	6·50	8·50	10·50

Deep Pie Plates.

Inch	9	10
Per gross	$8·50	10·50

Jelly Cake Pans.

Inch	9	10
Per gross	$7·50	10·00

Coffee Pot Covers.

Plain	1½	2	3	4	5	6 qts.
Inch	3	3¼	3¾	4½	5	
Per gross	$1·15	1·40	1·60	2·00	2·75	3·00
Rimmed	2¾	3	3½	4	4½ inches.	
Per gross	$2·25	2·50	3·00	3·50	4·00	

T. K. Breasts only.

Inch	7¾	8	8¾	9	9¾	10	10½	11	11½
Per gro.	$6·00	6·50	6·75	7·25	7·75	9·50	10·00	12·00	13·00

Grater Plates.

Sheet	¼	½	1
Per gross	$3·00	6·00	11·50

Scolloped Cake Pans.

	Small.	Large.
Without Tubes, per gross	$8·00	11·50
With Tubes "	10·50	14·00

Stamped Square Pans.

No.	¼	1
Per gross	$7·50	14·50

Common Square Pans (One Sheet).

Per gross	$12·50

Milk Skimmers (Plain or Pierced).

Per gross	$4·00

Lettered Plates.

Inch	5½	6
Per gross	$3·25	4·00

Steamer Bottoms.

Add $1 per gross, or 10c. per doz. to list of Pot Covers.

Tin Stove Pipe Rings.

Inch	4	4½	5	5½	6	7	
Plain, per gro.	$4·50	5·00	5·50	6·00	6·50	7·50	
Jap'd or Burn'd	6·00	6·50	7·00	8·00	9·50	10·00	

Coffee Boiler Lips.

	Small.	Large.
To Rivet, per gross,	$0·80	1·10
To Solder "	1·25	

Plain Stamped Water Dippers.

	½ pint.	Pint.	Quart.	2 quarts.	2½ quarts.
Per doz	·90	1·15	1·50	1·85	2·50

RETINNED WARE, dis 20 @ 25 %.

Retinned Milk Pans.

Qts	½	1	1½	2	3	3½	4	5	6	8	10	12
₩ doz.	1·20	1·50	1·75	2·00	2·25	2·75	3·15	3·50	3·85	4·75	5·25	5·75

Dipper Bowls, Plain Stamped, dis 20 @ 25 %

Pints	½	1	Quarts	1	2	2½
Per doz.	·70	·75	Per doz	1·00	1·25	1·75

Dipper Bowls, Retinned, dis 20 @ 25 %

Pints	½	¾	1	Quarts	1	2	2½
Per doz.	·75	·95	1·05	Per doz	1·40	1·75	2·25

Pans.

Dish Pans, Tinned, dis 20 @ 25 %

Quarts	7	8	10	14	17	21	30
Per doz	$3·50	4·00	5·00	7·00	9·00	11·00	15·00

JAPANNED TIN WARE.

Canisters, Common, dis 10 %

Pound	½	1	2	3
Per doz	$1·10	1·60	2·50	3·25

Canisters, Hinged, dis 10 %

Pound	1	2
Per doz	$1·75	2·75

Candlesticks, Japanned,	dis 10 %
No	1 2
Per gross	$8·00 7·00
Cake Boxes, Round,	per nest, $3·25, dis 10 %
" Square,	per nest, 4·25, dis 10 %
Chamber Pails, Japanned (Smith, Burns & Co.),	dis 10 %

Nos	1	2	3	5
Green, per doz	$8·00	9·00	10·50	12·50
Oak "	9·50	10·50	12·00	13·50

Dust Pans, Corrugated,	per gross, $22·00, dis 10 %
Box Graters,	per gross, $4·00, dis 10 %
Molasses Cups,	dis 10 %

Pint	½	1	2
Per doz	$1·25	·50	·97

Lunch Boxes, per doz	7 in $2·00; 8 in. $2 50; dis 10 %
Pepper Boxes Japanned	dis 10 %
Per gross	Small, $8·00; Large, $4·00
Toy Banks, House	dis 0 %
Tea Trays, American Tea Tray Co	dis 15 %

No	1	2
Per gross	$7·00	5·50

Toy Banks Gothic	dis 10 %

No	1	2	3
Per gross	$4·00	3·50	3·50

Toy Cups, Flaring	No. 1, $4·25; 2, $3·70 ₩ gross, dis 10 %
Toy Falls, Covered	dis 10 %

No	1
Per gross	$4·50

Toy Rattles	per gross, $2·25, dis 10 %
Trunks, Wire Handled	per nest (5) $1·50, dis 10 %
Spittoons, Tin	per gross, No. 2, $30, No. 3, $27, dis 10 %

PLANISHED TIN WARE.

Planished Coffee Pots, Round,	dis 25 @ 30 %						
Each	·60	·75	·85	·95	1·15	1·25	1·30 1·40
Pints	1	2	3	4	5	6	7 8
Planished Tea Pots, Round,	dis 25 @ 30 %						
Each	·70	·80	·90	1·05	1·15	1·40	1·75
Pints	1	2	3	4	5	6	8
Planished Tea Pots, Oval,	dis 25 @ 30 %						
Each	·70	·80	·90	1·05	1·15	1·40	1·75
Pints	1	2	3	4	5	6	8

Planished Pepper Boxes, No. 1	per doz., $1·50
Planished Flour Dredges, No. 3, $2·10; 4, 2·45 ₩ dozen.	
Planished Round Coffee Biggins	dis 25 %

Pints	2	3	4	5	6	8
Each	$1·00	1·10	1·30	1·40	1·60	2·00

Planished Oval Coffee Biggins	dis 25 %

Pints	2	3	4	5	6	8
Each	$1·15	1·25	1·40	1·60	1·80	2·25

Planished Oval Chafing Dishes, Imperial Covers	dis 25 %

Inch	10	12	14	16	18	20	22	24
Each	$3·85	5·00	6·25	7·60	9·00	11·50	15·00	16·50

Planished Oval Chafing Dishes, Low Covers	dis 25 %

Inch	10	12	14	16	18	20
Each	$3·25	4·25	5·20	6·20	7·80	9·25

Planished Low Dish Covers	dis 25 %

Inch	10	11	12	14	16	18	20
Each	$ ·70	·80	1·00	1·25	1·50	2·00	2·75

Planished Imperial Dish Covers	dis 25 %

Inch	10	11	12	14	16	18	20	22	24
Each	$1·55	1·70	2·00	2·60	3·15	3·45	4·60	5·45	6·30

Planished Etnas, on Stands	dis 25 %

Pints	1½	2	3	4	5
Each	$0·90	1·00	1·20	1·50	1·75

Planished Liquor Mixers	dis 25 %

Nos	0	1	2
Per doz	$2·00	2·10	2·45

Planished Oval Melon Molds	dis 25 %

Nos	2	3	4	5	6	7	8
Each	·60	·65	·70	·80	·90	1·00	1·15 1·25

Planished Oval Tumbler Warmers	dis 25 %
Ea fit 1, 2, 3, and 4 O. G. Urns	each, $2·50
Planished Oval O. G. Urns	dis 25

Nos	0	2	3	4	5	6	7	8
Each	$4·00	5·45	6·30	7·00	7·75	9·25	11·25	12·50 15·00

Planished Round Urns	dis 25 %

Nos	0	1	2	3	4	5	6	7
Each	$4·20	4·85	5·45	6·30	7·75	9·00	11·00	14·25

Planished Round Oyster Dishes, (Complete)	dis 25 %

Nos	1	2
Each	$2·10	2·80

Planished Oyster Dish Plates	dis 25 %

Nos	1	2
Each	$0·25	0·30

Oyster Dish Covers	dis 25 %

Nos	1	2
Each	$0·30	0·35

Tea Pot Handles—P. S. & W. dis 20 %

Stow's Patent Hollow Tea Pot Handles.

No. 1, Small	4½ inches	per gross, $11·50
No. 2, Medium,	5 "	" 12·50
No. 3, Large,	6 "	" 13·50
No. 4, Ex. Large,	7¼ in., for Wash Pitchers, &c.	" 18·00

Stow's Patent. New Pattern.

No. 25, Small,	4½ inches	per gross, $11·50
No. 35, Medium,	5½ "	" 12·00
No. 45, Large,	6½ "	" 13·00

Solid Iron, Tin Tipped.

No. 10, Small,	4½ inches	per gross, $9·00
No. 15, Medium,	5½ "	" 9·50
No. 20, Large,	6½ "	" 10·75

Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.

No. 12, Bronzed and Tin-Tipped		per gross, $13·50

Saucepan Handles, Or Best Malleable Iron.

P. S. & W. dis 20 %

Japanned.

No. 1, 5¼ inches long		per gross, $3·50
No. 2, 6	"	" 3·75
No. 3, 6¼	"	" 4·00
No. 4, 7¾	"	" 4·25
No. 5, 8	"	" 4·50
No. 6, 9	"	" 4·75

Tinned.

No. 1, 5¼ inches long		per gross, $4·25
No. 2, 6	"	" 4·50
No. 3, 6¼	"	" 4·75
No. 4, 7¾	"	" 5·25
No. 5, 8	"	" 5·50
No. 6, 9	"	" 5·75
Japanned		per lb., 16
Tinned		" 20

Iron Kettle Ears (P., S. & W.) dis 45 %

Half gross pairs in a package.

Tinned.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	88c	$1·00	1·50	1·75	2·10	2·25	3·50	4·75

Black.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	75c	88c	$1·25	1·50	1·75	2·25	2·75	4·00

Tinned Tea Kettle.

Nos	4	5	6
Per gross pairs	$1·75	2·10	2·75

Extra Heavy Tinned Kettle Ears—French Pattern.

Nos	1	2	3	4	5	6	7
Per gross pairs	$1·00	1·25	1·50	1·75	2·25	2·75	3·50

Malleable Iron Kettle Ears for Coal Hods, &c.

P., S. & W.	dis 20 %
No. 10 Small	₩ lb, Tinned, 20c; Black, 16c
No. 20 Medium	₩ lb, " 20c; " 16c
No. 30 Large	₩ lb, " 20c; " 16c
No. 40 Extra Large	₩ lb, " 20c; " 16c
In cases of 100 lbs. each.	

Milk Can or Boiler Handles—(P. S. & W.) 4½ in. dis 25 %

Plain, 8c.; Japn'd, 9c.; Tinned, 16c. per lb.; Malleable Clips or Ears to match, Tinned 20c per lb.

Toilet Ware Handles—4½ inches (P. S. & W.) dis 35 %

Plain with drilled holes, per lb	9c
Plain with Cast "	8c

Plumbers' Scrapers—(P. S. & W.) dis 25 %

Extra quality, length 6 in., per doz. $4·00

METALS.

IRON.—DUTY: Bars, 1 to 1¼ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb

Pig Iron—AMERICAN.

Foundry No. 1	₩ ton,	$30 00 @ 31 00
Foundry No. 2	"	28 00 @ 29 00
Gray Forge	"	25 00 @ 28 00
White and Mottled	"	

SCOTCH.

Coltness	"	
Glengarnock	"	35 00 @ 37 00
Eglinton	"	34 00 @ 35 00
Summerlee	"	

Bar Iron.

Am. Refined, at mill	₩ lb 3c

Rails.

Welsh, gold	₩ ton,	48 00 @ 50 00
American, at works, currency	"	@ 35 00
Old Rails, currency	"	34 00 @ 35 00

Scrap.

Wrought Scrap fr	"	35 00 @ 37 00

Bar Iron from Store.

Common Iron.

⅜ to 2 in. round and square	₩ ton,	$ 65 00
⅜x9-16 in " "	"	70 00
½ in. " "	"	72 50
⅝ to 3 in. "	"	70 00
1 to 6 in. wide x ⅜ and 1 in. thick	"	65 00
1¼ to 6 in wide x ½ & 5-16 in. thick	"	70 00
1 and 1¼ in. x ¼ and 5-16	"	72 50

Swedish Iron.

1¼x⅜ and ½	"	155 00
1¼x⅝ to ⅝, and ½ square	"	150 00
1¼ to 5x⅛ to ⅝ and ¼ to 2-in. square	"	145 00
6 to 8x⅜ and ½	"	160 00

Refined Iron.

¼ to 2 in. round and square	"	67 50
1 to 6 in. wide x ⅜ to 1 thick	"	67 50
1¼ to 6 in. wide x ½ and 5-16 thick	"	72 50
1 and 1¼ x ¼ and 5-16	"	72 50

Large Rounds.

2¼ to 2¾, round and square	"	77 50
3, 3¼ and 3½ in.	"	82 50
3¾ and 4 in.	"	90 00
Rods—⅜ and 11-16, round and square	"	70 00
½ and 9-16, " "	"	72 50
5-16, " "	"	80 00
⅝, " "	"	85 00
5-16, " "	"	90 00
¾, " "	"	95 00
5-16, " "	"	127 50

Sheet Iron.

Nos.	American and English.	Common R. G. American.	R. G. English.
Nos. 10 to 20	₩ lb 4¼ @ 4½c	5½c	6c
21 to 24	" 4¾ @ 5c	6c	6c
25 to 26	" 5 @ 5¼c	6c	6c
27	" 5¼ @ 5½c	6¼c	6¼c
28	" 5½c	6¼c	6½c

Galvanized, Nos. 16 to 20, prime	₩ lb	10; 2d quality ₩ lb 9c
" 21 to 24	"	11 " " 10c
" 25 to 26	"	12 " " 11c
" 27	"	13 " " 12c
" 28	"	14 " " 13c
Patent Polished		₩ lb 16c
Russia, Nos. 8 to 16		₩ lb 9c
" Stalned, No. 1		" 17c
Belgian		" 12c

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

½	⅝	¾	⅞	1 inch.
$4·50	3·50	4·50	5·25	6·50 per doz.

RUSSIA IRON.

5	5½	6	7 inch.
7·00	9·50	12·00	14·00 per doz.

BABBITT METAL.

Excelsior				cash, dis 10 %
No.	1	2		Extra.
	10c	12c	15c	20c @ 25c

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper 4 cents ₩ lb; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.

American Ingot	₩ lb 22c
English	"

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot	35c ₩ lb
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot	38c. "
Braziers' Copper, 12 oz. per square foot and lighter	41c. "
Circles less than 24 inch in diameter	39c ₩ lb
Circles, 24 inch diameter and over	41c. "
Segment and Pattern Sheets	38c. "
Locomotive Fire Box Sheets	33c. "
Sheathing Copper, over 12 oz. per sq. ft	31c. "
" " 12 oz. ₩ sq. ft. and lighter	41c. "
Bolt Copper	35c. "

No Copper in Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case	8c. ₩ sheet
14x48, less than case	10c. "
Boiler Sizes, 7 and 8 inch	12c. "
" 9 inch	15c. "
Other sizes not larger than 30x60	2½c. ₩ sq.
Larger than 30x60	3c. "
Copper Bottoms, 32 @ 33c. ₩ lb	net

O'NEILL'S PATENT PLANISHED COPPER.

14 and 16 oz. and heavier	38c.	By the case, 35c. ₩ lb
12 oz. and lighter	39c.	" " 38c. "

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60

14 and 16 oz. and heavier	38c. By the case, 37c. ₩ lb
(And all sizes not over 30 inches wide.)	
30x60	
14 and 16 oz. and heavier	40c. ₩ lb
12 oz.	42c. "

LEAD—DUTY: Pig, $2 per 100 lbs.; old Lead, 1½ cent per lb.: Pipe and Sheet, 2½ cents per lb. All subject to a reduction of 10 per cent.

Spanish	6¼ @ 6¾c gold
German Refined	6¾ @ 6¾c gold
English	6¾ @ 7c gold
American	6c gold
Bar	dis 20 %
Pipe	dis 20 % 9c.
Tin Lined Pipe	dis 10 % 16½c.
Sheet	dis 10 @ 20 % 9c.
Shot	dis 20 %. Drop, 9c.; Buck. 9½c.
Solder	No. 1, 15 @ 15½c; No. 2, 13¾ @ 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 9¼ cents; over 7 cents, and not above 11, 8 cents per lb.; over 11, 3¼ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool	15 @ 16c
Spring	10c
Homogeneous	12½c
Tire	12½ @ 13½c
Machinery (round and square)	10 @ 11c
File	11c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₩ lb 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₩ lb 12c and upward
Machinery	" 14c.
Hammer	" 15c,
Gun or Homogeneous	" 16c

English Steel.—payable in gold, dis 5 % cash.

Best Cast	₩ lb	18c
Extra Cast	"	19c
Round Machinery, Cast	"	11½c
Swaged, Cast	"	18c
Best Double Shear	"	18c
Blister, 1st quality	"	13½c
" 2d quality	"	11½c
" 3d quality	"	10½c
German Steel, Best	"	11½c
do 2d quality	"	10½c
Sheet Cast Steel, 1st quality	"	18c
" " 2d quality	"	15c
" " 3d quality	"	14c
File Steel, Flat and ⅝ Round	"	12½c
" Square and Round	"	13c
" Mill	"	13½c
" Taper to 4 inch	"	17c
" Taper 3 and 3½ inch	"	19c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash	6¾ @ 7c., gold
American "	7¾ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per lb; Manufactures of, not enumerated, 35 per cent. ad val.—all subject to a reduction of 10 per cent. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca	₩ lb 26c., gold
Straits	₩ lb 24c., gold
English	₩ lb 21½ @ 23c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal		11·00 to 11·25
12x12,	"	11·75
14x20,	"	12·00
I X 10x14,	"	13·50
12x12,	"	14·00
14x20,	"	14·50
D C 12½x17	"	10·75
D X 12½x17	"	13·00
For each additional X add		2·25

COKE TIN PLATE.

	Best	2d Quality.	Ordinary.
I C 10x14	$10·50 @ 11·00	9·50 @ 10·00	9·00 @ 9·50
I C 12x12	11·00	10·50	
I C 11x20	11·25	10·50	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$10·00 @ 10·50	9·50 @ 10·00	9·00 @ 9·00
I X 14x20	12·75		
I C 20x28	21·00 @ 21·50	20·00 @ 21·00	17·00 @ 19·50
I X 20x28	26 00		
I C 20x200 ft.	25·00		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ₩ lb. All subject to a reduction of 10 per cent.

Sheet	cask 9¼c
"	open 9¾c

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas linen	6¼ @
" cotton. No. 1	6¾ @
" " No. 2	@ 5
White linen rags, No. 1	6¾ @
" " No. 2	4¾ @
Colored	2¾ @
Mixed woolens	@ 2¾
Soft woolens	@ 5¾
Gunny bagging	1¾ @ 2
Jute Butts	2¾ @ 2¾
Kentucky bagging	5¼ @ 5½
Book stock	4 @ 4¾
Waste paper and scraps	1 @ 1¾
Rope cuttings	1½ @ 8
Kentucky Bale rope	4 @ 4¼
Oakum junk, No. 1	5½ @ 5¾
" No. 2	@ 4
Grass rope	3¾ @
Tarred Shaking	1½ @
White Collar Cuttings, all paper	@
" " " muslin lined	@
" Envelope "	@
Hard White Shavings, No. 1	@
Soft " " No. 1	@
White Shavings, No. 2	@ 6
Mixed Shavings, part white	@ 4¾
Imperfections, No. 2, best folded sheets	@
" " 1, Heavy Stock	@ 5
Book Stock, Mixed	@ 4
" " No. 2, light	@ 2¼
Prints	@ 2
Pure Manilas	@
Bogus Manilas and Hardwares	@ 1¾
Commons	@
Binders' Board Cuttings	@ 2
Straw Board Cuttings	@ 1¾

Old Metal.

Copper	@ 19
Yellow metal	@ 15
Brass	@ 14
Heavy Composition	@ 18
Old lead, solid	@ 6½
Tea lead	4½
Wrought iron	@ 1¾
Sheet iron	@
Cast iron	@ 1¾
Machinery iron	@
Zinc	5
Pewter, No. 1	17
" No. 2	@ 12
Spelter	@ 6

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₩ lb 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	25c
Black Paint, in oil	kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best	50 @ 75c
" " in oil	35 @ 65c
" Chinese, dry	8@
" Ultramarine	25 @ 30c
Brown, Spanish	1¾ c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Chrome	15 @ 20c
" in oil	18 @ 25c
" Paris	good, 30c; best, 40c
" " in oil	30c " 45c
Mineral Paints	1¾ @ 4c
Orange Mineral	14½c
Red Lead, American	9¾c
" English	10½c
" Venetian (N. C.) dry	2¾c
" in oil	asst'd cans, 11c; kegs, 8½c
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 26c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	₩ lb 92
" English	1 90
" Trieste	1 65
" American, Common	25c
White Lead, American, pure dry	10½c
" " in oil	11½c
White, Paris, English, prime	in bbls. 2¾ @ 2¾c
Yellow Ochre, French	2¾ @ 2¾c
" " in oil	asst'd cans, 11c; kegs, 8½c
" Vermont	In casks 1¾c
" Chrome	17 @ 27c
" in oil	18 @ 28c
Zinc White, American No. 1 dry	9c
" " 1, in oil	11
" French (Paris)	11
" " in oil	12

Oils.

Linseed Raw	₩ gal. casks, 87c.	bbls, 88c
" Boiled	" 91c.	" 93c
Whale, Crude	"	
" Bleached Winter	"	
Sperm, Crude	"	1·85
" Winter unbleached	"	1·85
" bleached	"	1·90
Seal, Extra Refined	"	
Lard, Pure Winter	"	
" Spring	"	1·00
Cotton Seed, Crude	"	60c
" Southern Yellow	"	65c
" White	"	
Neatsfoot, Winter	70c @ $1·10	
Natural Lubricating	38c @ 40c	

Sundries.

Asphaltum	9c
Benzine	₩ gal. 16c
Chalk	1¾c
" Block	
Dryer, Patent, Am'n	asst'd cans, 10¾c.; kegs 9c
" English	" 11c.; " 9c
Flocks	
Frostings	50c
Glue, White	33 @ 47c
" Sheet	20c
Glaziers' Points, Zinc	8c
Gum, Copal	26c
" Damar	25c
" Shellac, English	60c
" " dark	50c
Litharge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	36c
Whiting, Spanish	1c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	
6 x 8 to 10 x 15	$10·25	$9·25	$8·75	$8·00
11 x 14 to 16 x 24	12·00	11·00	10·00	9·50
18 x 22 to 20 x 30	15·00	13·50	12·00	10·50
15 x 36 to 24 x 30	17·50	15·25	12·50	
26 x 28 to 24 x 36	18·25	16·00	13·25	
26 x 36 to 26 x 44	20·00	18·00	14·50	
26 x 46 to 30 x 50	21·00	19·00	15·25	
30 x 52 to 30 x 54	22·50	20·25	16·25	
30 x 56 to 34 x 56	24·50	21·75	19·00	
34 x 58 to 34 x 60	26·00	24·50	21·50	
36 x 60 to 40 x 60	30·50	27·00	24·50	

DOUBLE.

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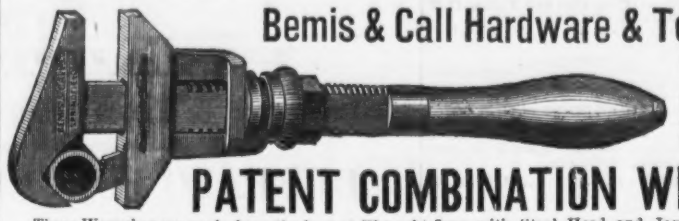

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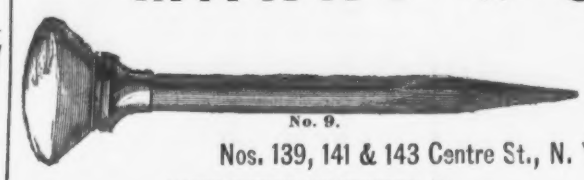

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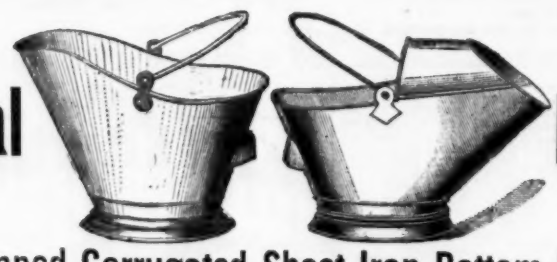
Coal  **Hods.**

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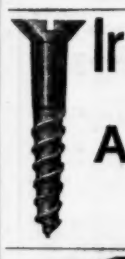

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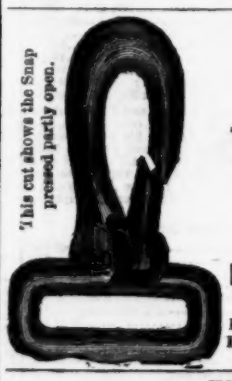

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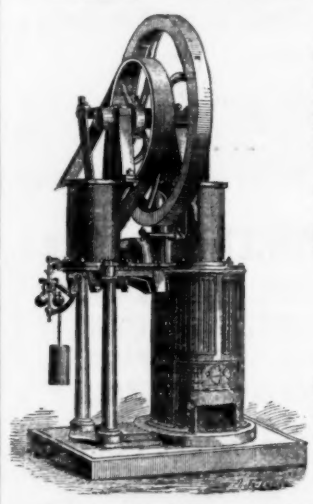

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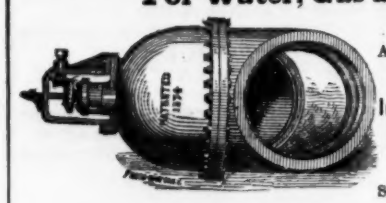

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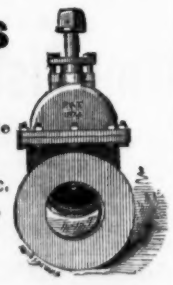

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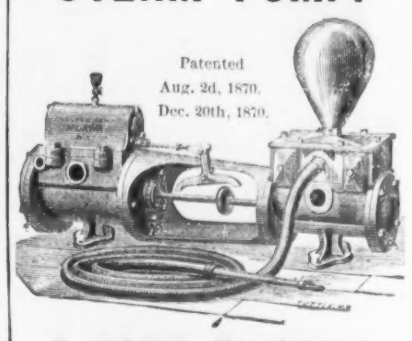

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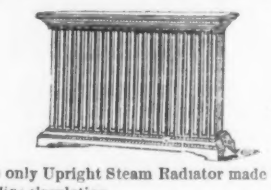

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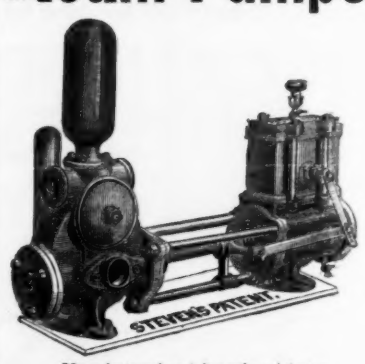

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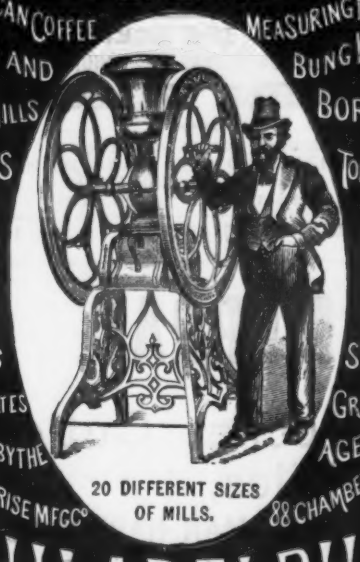

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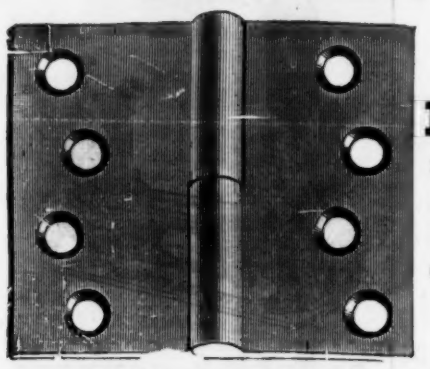

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CONTINENTAL LOCKS,

Made of Wrought Iron or Brass, very super quality, and only an auger used in mortising.

SCHWEITZER PAD LOCKS,
EXCELSIOR COMPASSES.
EXCELSIOR DIVIDERS,

WITH

STUBS' STEEL POINTS,

Best and Cheapest Goods in the market. Sole Agents for the United States for

NEWBOULD'S FILES AND TOOLS
French Coffee Mills.
NOBLE MFG. CO., Tools, Ship Augers, &c.
Emery, Waterhouse & Co., Shovels & Spades

We also make a superior

AXE. { *"Queen of the Forest,"* *"Wood Chopper's Pride,"* &c

Disston's Saws. (Largest stock in the City).

General dealers in

FOREIGN & DOMESTIC HARDWARE.

SOLE AGENTS IN NEW YORK.

MOWRY, MASTERS & ANDREWS,
AM. TEA TRAY WORKS,
GREENWICH, N. Y.

TIFFT & HOWARD, 12 MURRAY ST.

SOLE AGENTS IN NEW YORK.

J. F. GREEN & BRO.
Manufacturers of Family Grindstones,
HAVERSTRAW, N. Y.
TIFFT & HOWARD, 12 MURRAY ST.

TIFFT & HOWARD,
MANUFACTURERS OF
GAS AND KEROSENE STOVES,
AND PATENTED SPECIALTIES IN
HOUSEKEEPING GOODS,
12 Murray Street.

THE CELEBRATED

YALE LOCKS

FOR ALL USES.

ORNAMENTAL REAL BRONZE HARDWARE.

Yale Lock Manufacturing Co., Stamford, Conn.
Salesroom, No. 298 Broadway, NEW YORK.

The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.
Factories at KENSINGTON, CONN.
MANUFACTURERS OF

Shovels, Tongs and Pokers,

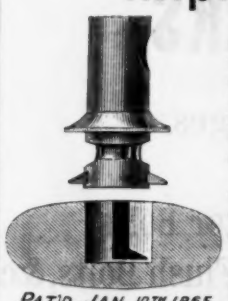
WITH PATENT RIVETED JOINTS.

Send for our new Catalogue

and Price List of Hollow Furnishing Hardware.

Patent Spiral Spring Coal Tongs.

Improved Door Knobs.



PAT'D, JAN 10TH 1865.

On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st., page 11, for illustrated description of our patent **Telescope Locks and Latches**, with patent Flat Steel Perforated Keys.

Address

BRANFORD LOCK WORKS,
Branford, Conn.

Or, THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,
18 & 20 Cliff and 243 & 245 Pearl Streets, New York

Easily Applied and not Liable to get out of Order."—From Report of Judges at American Institute Fair, 1872.

The Challenge Door Spring Co.,

Patented. **Exclusive Manufacturers of the** [March , 1871

In Appearance the Most Beautiful. In Action the Most Graceful. In Use the Most Reliable.

The Challenge Springs are manufactured from **Steel Wire, tempered by an Improved Process**, the result of repeated experiments, and must not be classed by dealers with the numerous worthless "Coil Springs" made from common Bed Spring Wire.

No. 49 Ann Street, NEW YORK.

Acknowledged the Best.

"Champion."

Equal pressure on the Rolls.
Clear Table, Self Regulating & Elastic.
Durable.

"Champion."

Makes a straight Flute.
Never Cuts the Material.
Don't get out of Order.

CHAS. FELDER, 105 Reade St., N. Y.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel.....₩ ℔ 14c
Peter Wright's.....₩ ℔, gold, 12½c
Wilkinson's.....11½c
Eagle.....11 cents currency—dis 15 @ 15&5 %
Apple Parers.—Union.....per doz $3 00
Skeleton..... " 8 00
Victor, Improved..... " 8 25
Reading " ..... " 8 50
Turn Table, " ..... " 12 00
Bay State Paring, Coring and Slicing..... " 50c
Discount for 25 dozen lots.....
Axes.—Mann's Light.....Per doz. $13 00 @ 12 50
Hunt's Light..... " 13 00 @ 12 50
Red Indian, all sizes..... " 12 50 @ 12 00
Red Chieftain, all sizes..... " 13 00 @ 12 50
Crown Prince..... " 13 50 @ 13 00
Augers and Auger Bits.—Pierce's Pat. Twist Bits.....dis 25 @ 30 %
Douglass' & Ives' Bits.....dis 30&10 %
Connecticut Valley Auger Bits.....dis 35&10 %
Cook's Bits.....dis 40&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 30&5 %
Douglass' & Ives' Augers.....dis 30&10 %
Watrous' Ship Augers.....dis 10 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearn's Patent Hollow Augers.....dis 25 %
Balances.—Landers Frary & Clark's.....dis 15 %
Chattillon's.....dis 15 %
Morton's.....dis 15 %
Common Spring with Hook.....₩ doz $1 38 @ 2 00
Bells.—Bevin Bros. Mfg Co. Light Hand Bells.....dis 60&10 %
Other makers light.....dis 65&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 30 %
Great Western and Kentucky Cow.....dis 50&10 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 15 @ 20 %
Douglass' Mfg. Co., complete with augers..dis 15 @ 20 %
Common Boring Machines, no Augers.....$4 25 @ 4 00
Augmator, " " ..... 5 25 @ 5 00
Bolts.—Eastern Carriage Bolts .....special prices
Western " " .....
Philadelphia " " .....dis 50 @ 50&5 %
Wrought Shutter Bolts.....dis 50 %
Cast " " .....dis 50 %
Skelly's Phila. Norway Iron, finish, points.....dis 50 %
Braces.—Barber's.....dis 40&5 %
Backus.....dis 45 @ 50 %
Bartholomew's American Ball.....dis 10&10 %
Spofford.....dis 40 @ 40&5 %
Butts.—Cast Fast Joint, Narrow.....dis 40 @ 40&5 %
" " Broad.....dis 50 @ 50&5 %
Cast Fast Loose Joint.....dis 50 @ 50&5 %
" Acorn, Loose Pin.....dis 40&10 %
Wrought Loose Pin.....dis 35 %
" Table Hinges and Back Flaps.....dis 40 %
" Narrow.....dis 30 %
" Loose Joint.....dis 35 %
" Reversible.....dis 35 %
Parker's Blind Butts.....
Shepard's " " ..... } dis 50 %—dis by the case 50&5 %
Clark's " " .....
Cherrytree " " for wood. .....
Lull & Porter's " " .....dis 40 %
Clark's Mortise Butts.....dis 40 %
Chains.—German Halter.....dis 15 @ 20 %
" Coil.....dis 15 @ 20 %
Galvanized Pump.....₩ ℔ 15c
Best Proof Coil Chain—
₩ ℔... 13½ 10¾ 10 9¼ 9½ 9 8½c gold
⅛ 3-16 5-16 ¼ 7-16 ½ ⅝ in.
By the cask, 560 lbs., discount ½c per lb. Common Chain, ½c per lb. less than proof.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40 @ 40&10 %
Beaty's Framing and Firmer.....dis 10 @ 15 %
Casters.—Porcelain Wheel.....dis 35&10&5 %
Iron.....dis 30&10 %
Brass.....dis 30&10 %
Clothes Wringers.—Universal..... per doz $68 00
Novelty..... " 66 00
Reliance..... " 68 00
Providence..... " 68 00
Monitor..... " 68 00
Orders for 5 dozen, discount $1 per dozen.
King Wringers (Iron Frame).....per doz $68 00
Coffee Mills.—Common Box and Side.....dis 10 @ 15 %
Patent Box and Side.....dis 10 @ 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.'s ..dis 60 @ 60&10 %
Concave Adjustable Handle.....dis 10 %
Beatty.....dis 10 @ 15 %
Fry Pans.
Tinned.....dis 20 %
₩ doz..$3·00 3·25 3·62 4·00 4·50 5·00 5·50 6·00 7·50
No..... 0 1 2 3 4 5 6 7 8
Burnished.....
₩ doz..$2·50 3·00 3·38 3·75 4·12 4·50 5·00 5·62 6·75
No..... 0 1 2 3 4 5 6 7 8
Files.
Nicholson Mill Files.... new list, $5 00 to £ cur dis 10 %
" Bastard A..... " 5 00 to £ cur dis 10 %
" Taper..... " 5 00 to £ cur dis 10 %
Butcher's Mill.....$5 75 to ℔ gold
" Bastard..... 5 50 to £ gold
" Taper..... 5 50 to £ gold
Moss & Gamble—Mill, Taper and Bastard.....5 50 @ 5 25 to £ gold
Fluting Machines.
K. F. M.—4¼ in. rolls, $5·50.....dis 10 %
" —6 in. rolls, $6·65.....dis 10 %
Mrs Knox—4 in. rolls, $5·50.....dis 10 %
" —6 in. rolls, 6·65.....dis 10 %
Hammers.
Yerkes & Plumb's.....dis 10 %
Hammond & Son's.....dis 10 %
Veree.....dis 10 %
Hatchets.
Beatty's.....dis 10 @ 15 %
Shingling and Half. { ₩ doz...$7·00 7·50 7·75 8·00 / No..... 1 2 3 4
Yerkes & Plumb.....dis 10 %
Shingling and Half. { ₩ doz...$7·00 7·50 8·00 8·50 / No..... 1 2 3 4
Claw.... { ₩ doz..... $7·50 8·00 / No..... 1 2 3
Hinges.—Strap and T.....dis 25&10 %
Bonney's No. 1 Gate.....dis 25 %
" No. 2 and 3.....dis 33 %
Horse Nails. Nos. 6 7 8 9 10
Ausable..... 27 25 24 23 22
Globe..... 28 26 25 24 23
Brundage..... 26 24 23 22 21
Nos. 5 6 7 8 9 10
Putnam..... 32 28 26 25 24 22
On Ausable, Globe and Brundage 1000 ℔ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise..... dis 45 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks.
₩ doz.....$10·50 10·50 12·00 13·00 15·00 15·00 } dis 15 %
No..... 9 9¼ 10 10½ 11 11½ /
₩ doz.....$18·00 18·00 22·00 22·00 } dis 15 %
No..... 12 12½ 13 13½ /
Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" " Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincoln's " .....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 10 %
Woodruff.....dis 10 %
Stowe.....dis 10 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
Planes.—Auburn Tool Co., "Bench ".. dis 35 @ 35&5 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plane Irons.—American.....list net
Butcher's.....gold 2, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Plumbs and Levels.
Stanley Rule and Level Co.....dis 60&10 %
Wm. Johnson, (Stanley List).....dis 60&10 %
Rakes.—Cast Steel Garden.....dis 33⅓ %
Malleable Garden.....dis 33⅓ %
Wood Head Iron Teeth.....dis 30 @ 40 %
Rules.—Stanley Rule and Level Co.....dis 60 @ 60&10 %
Steven's and Hubbard's.....dis 60 @ 60&10 %
Steelyards.—American Pattern.....dis 15 %
₩ doz.....$5·50 7·00 9·00 1·00 11·00 12·00
No..... 50 100 150 200 250 300
English Pattern.....dis 15 %
₩ doz.....$7·00 8·67 10·67 12·67 14·67 16·67
No..... 50 100 150 200 250 300
L. F. & C. Excelsior.....dis 10 %
₩ doz.....$9·00 10·00 12·00 15·00 18·00 21·00
No..... 50 100 150 200 250 300
Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₩ doz. $11·00 net
Clipper No. 10, Boxed and Sharpened.....₩ doz $10·50
" " 8, " " " 10·00
Common Scythes.....₩ doz $7·00 @ 10·00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 50 %
Disston's Hand.....dis 12½ %
W. McNiece's H'd, Cross-Cut & Cire'r, new list. dis 15 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb. 1873.....dis 20&10 %
" Back Strap " .....dis 20&10 %
Oliver Ames & Sons.....new list dis 12½ %
Brady Shovel Co.....dis 12½&5 %
Sad Irons.—Richmond (polished face) .per lb. 4½c. net
Coquanock (polished face)..... " 4 c. net
Stone.—Arkansas Oil, No. 1..... " $1·88
Turkey Oil, No. 1..... " 1·00
Washita Extra..... " 30c
" No. 1..... " 22c
" " 2..... " 18c
" " 3..... " 5½c

Screws.—Iron.....new list, Jan. 1st, 1874, dis 52½ %
Brass.....dis 52½ %
Spoons.—
Plated Spoons, Rogers Bros.'.....dis 40 %
Britannia, Spoons.....dis 40 @ 40&10 %
German Silver.....new list dis 10 @ 15 %
" Light.....new list dis 15&5 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 40 %
Torry's Door.....dis 40 %
Stocks and Dies......dis 15 %
Stove Polish.—Gem.....₩ gross, $5·00
Onyx..... " $5·00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
" " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " " .....dis 30 %
Vises.—Solid Box.....₩ ℔ net 15c
Wrenches.—Coes Genuine.....dis 40 %
Coes Imitation Wrought Bar.....dis 50 %
" " Malleable Bar.....dis 60 %
" " (Kellogg) Malleable Bar.....dis 30 @ 10 %
Tafts Pattern (Wrought Bar).....65 %
" " Kellogg's (Nail Bar).....dis 65&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....dis 37½ @ 40 %
No. 19 to 26.....dis 40 @ 42½ %
No. 27 to 36.....dis 45 @ 47½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 20 %
Galvanized Wire No. 0 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

July 25, 1874.

Augers—Snell Mfg. Co.....dis 20 %
Bits, Auger—Snell Mfg. Co.....dis 20 %
Bells, Cow—Yaw's Genuine.....dis 25 %
Bolts—Carriage and Tire.....dis 70&20 %
Braces—Bit, Spofford's Patent.....dis 40 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 25 %
Cast Loose Joint.....dis 60 %
" " Pin.....dis 45 %
" " " Japanned.....dis 45 %
" " " Silver Tipped.....dis 25 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 35 %
" Table and Back Flaps.....dis 30 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 35 %
Leather new list.....dis 30 @ 30&5 %
Beaters, Egg, "Peerless".....per doz $4·00
Brick—Bath (box of 2 doz) Best English.....$1·50
" Rutherford ".....$1·00
Chalk—White, Carpenter's .....₩ gross, 50c
Red, Carpenter's " 75c
Blue, " " 90c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable .....₩ ℔ 10½c
Cherry Seeders.....per doz $12 00
Clothes Wringers, "Novelty " No. 2.....₩ doz $62 00
Elbows—Corrugated..... 5 5½ 6 7 }
Charcoal.....$8·50 4·00 5·25 6·50 } dis 10 %
Russia..... 7·00 9·50 12·00 14·00 /
Files—Maischoss Bros.....dis 50 %
Freezers Ice Cream—" Champion .....dis 33⅓ %
Hammers—Henry W. Kip's.....dis 7½ %
Hinges—Window Blind—
Clark's.....dis 50&5 %
Shepard's and Standard.....dis 50&5 %
Wrought Strap and T.....dis 30&10 %
Hods, Coal—Plain, Black and Galvanized.....dis 10 %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Palace Coal Vases.....dis 10 %
Hooks and Staples—Wrought.....dis 10 %
Hooks—Belt .....dis 80&10 %
Hasps and Staples—Wrought.....dis 50 %
Sad Irons.....dis 60&10 %
Kettles—Brass.....4c
Enameled.....₩ ℔. 50 @ 53c
Knives, Drawing—Oval No. 1.....dis 50 %
Razor Blade.....dis 60&10 %
Lanterns "Peerless,".....No. 1 3 10
₩ doz $26 00 $11 25 $13 75 dis 10 %
Gem, with guards.....$6 50
Tubular.....11 00
" with Guards.....11 50
Machines—Apple Paring, "Turn Table".....8·50 ₩ doz
Mills, Coffee—Box and Slide, common.....dis 10 %
Box Union and Eagle.....dis 10 %
" American .....dis 20 %
Nails—Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10
" " Finished & Pointed.....add 1c ₩ ℔
" " 1000 lbs.....
" Clinton.....No. 5 6 7 8 9 10
22 20 19 18 17c
Packing—Rubber.....dis 30 @ 35 %
Pencils, Slate—Soapstone.....4 5 6in.
30 40 50c. ₩ 100
Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₩ ℔ 9 c
Rivets—Iron, Black and Tinned.....dis 25 %
Copper.....dis 10 %
Rope—Manila, ¾ inch and larger.....₩ ℔ 15½c
Rules—Boxwood and Ivory, Stephens.....dis 60 %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 52½ %
Flat Head, Brass.....dis 52½ %
Staples—Blind, Boardman's Pat., ½ & ⅝.....₩ ℔ 37c
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 40 %
Britannia.....dis 40 %
Squares—Steel and Iron.....dis 40 %
Shoes, Horse—H. Burden & Sons.....new list 50 %
Shovels & Spades—Shepard, Forsyth & Dennison..dis 20 %
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Shears—Seymour's.....dis 60 %
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Vises—Parallel, Buffalo.....dis 20 %
Wrenches—Coes' genuine.....dis 40 %
Coes' Imitation.....dis 50&10 %
Tafts' Pattern.....dis 65&10 %
Ware—French, Tinned and Iron.....dis 25 %
Stamped and Japanned.....dis 10 %
Cast Iron Hollow.....dis 33⅓ %
Tin Plates.—Add for each X.....2·50
10x14, IC, Charcoal...$12 00 . 14x20 C. terne.....$10·75
12x12, " ... 12·50 | 20x28 C. " ..... 21·75
12½x17, " ... 11·50 | 20x28 X. " ..... 27·25
14x20, " ... 13·00 |
Pig Tin—Straits..... 30c @ 31c
Bar Tin..... 32c
Solder.....No. 1, 15c ; No. 2, 16c
Sheet Zinc—
"Lasalle".....570 100 ℔ casks
$10·00 10·30 ₩ 100 ℔s
Sheets.....$10·00
Iron Wire—Bright and Annealed.....dis 37½ %
Coppered.....dis 32½ %
Tinned.....dis 15 %
Tinned Broom, { Nos. 20 21 22 / 20c 21c 21c } dis 20 %
Copper—Sheathing 14 @ 18 oz.....₩ ℔ 33c
Planished.....₩ ℔ 39 @ 41c
Bottoms.....₩ ℔ 34c
Bolts.....₩ ℔ 35c
Braziers' Sheets.....₩ ℔ 35c
Sheet Iron.—
18 Common.....$5 00
24 Common.....5 00
24 W. D. Wood & Co., Smooth Finish.....6 10
Am. Russia..... A. B.
15c 12½c
Gen. Russia, No. 1 stained.....19c
" " clean.....20c
Galvanized.....dis 15 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$ @ 13·00
I. X. 10x14 Charcoal..... @ 17·00
I. C. Terne 14x20..... 11·00 @ 15·00
I. C. Terne 20x28..... 24·00 @ 25·00
I. C. Continuous..... 26·00
Block Tin.....₩ ℔ 30c @ 31c
Solder.—
S. & Co.....₩ ℔ 26c
Lead.—Pig.....₩ ℔ 7c.
Copper.—
Ingot.....₩ ℔ @ 36c
Planished... " @ 44c
Sheathing.. " @ 35c
Copper Drops @ 35c
Zinc. Cast, 500 to 1000 lbs.....₩ ℔ 10 c
Case, 100 lbs..... " 11 c
Slab..... " 7½c
Brass.—
Roll, No. 6 to 30.₩ ℔ 38c
" 30 to 38. " 42c
Babbit Metal.—
Sellew & Co.....₩ ℔ 38c
Antimony.....₩ ℔ 17c
Bismuth.....₩ ℔ $4 00
Nickel.....₩ ℔ $4 50

Sheet Iron.—
Gem Russia.....₩ ℔ 22c
Am Russia A.....₩ ℔ 15c
" " B..... " 12½c

	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'f'd.
15 to 20	4·4c	5·0c	7·9 c
22 to 24	4·6c	6·1c	8·1c
26	4·8c	6·3c	8·3c
27	5·0c	6·5c	8·5c

Galvanized Iron.—Full bundles.....dis 20 %
Nos. 18 to 20.....12c | No. 26.....14c
22 to 24.....13c | 27.....15c
Bar Steel.—Silver, ₩ ℔ 16c ; Crescent, 21c.
Iron Wire.....dis 35 %
Enameled Ware.....dis 45 %
One Piece Corrugated Elbows......dis 10 %

Charcoal Iron.		Russia Iron.	
4¼ inch.....	₩ doz $2·50	4¼ inch.....	₩ doz $5·00
5 "	" 3·50	5 "	" 7·00
5½ "	" 4·50	5½ "	" 9·50
6 "	" 5·25	6 "	" 12·00
7 "	" 6·50	7 "	" 14·00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

	₩ doz.		₩ doz
2-inch.....	$1 75	2½-inch.....	$2 75
3-inch.....	2 25	3½-inch.....	3 25
4-inch.....	2 50	4½-inch.....	3 50

Sheet Iron Bread Pans.....₩ ℔ 10c
American Broilers.....₩ doz. $12·00
Tinmen's Machines.....dis 5 %
Sad Irons.....₩ ℔, 4 c
Brass Kettles.—Ansonia..... 52c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent.

Iron, standard list assorted sizes, for large orders, 3c, card rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4·4c ₩ ℔ net
Iron Wedges.....4¼c ₩ ℔ net
Norway Nail Rods.....9¼c ₩ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....5c ₩ ℔ net
Beetle Rings.....8½c ₩ ℔ net
Fence Pickets—
⅝ round, bent to shape, 30c ₩ ft. of fence, less 15 % off net.

Discount off Standard List.

Carriage and Tire Bolts (new list).....70&10 % off net
Plow Bolts.....30, 10&5 % off net
Stove Bolts.....15 % off net
Machine and Square Head Bolts.....30&10 % off net
Coach and Lag Screws.....30&10 % off net
Bolt Ends.....35 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....7½c ₩ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6 c ₩ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in.....9 c ₩ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅜ in.....7 c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, 1c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, 1c ₩ ℔ ex. Nuts and Washers in 5 lb. boxes, 1½c. ₩ ℔ ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3¾c ₩ ℔ net ; ⅞ in. diam. 3¼c ₩ ℔ net ; ¾ in. diam. 4c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in casks, ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅞ in. diam. 5¼c ₩ ℔ net ; 9-16 in. diam. 6¼c ₩ ℔ net ; ½ in. diam. 7½c ₩ ℔ net. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¾ to 1 in. diam. 9c ₩ ℔ net; ⅝ in. diam. 10c ₩ ℔ net; ½ in. diam. 12 c ₩ ℔ net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 36 in. long, 5¼c ₩ ℔ net ; 8, 10 & 12 in. long, 6¾c ₩ ℔ net
Strap and T Hinges.....20 & 10 % off net, delivery as customary.
For purchases amounting to $250 between May 20th and December 31st, 5 % extra off.
Screw Hitching Rings.....$5 25 ₩ 100 net
Duck Nest Tuyere Irons.....$14 50 ₩ doz net
Cast Iron Washers.....₩ ℔ 4c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long..... ₩ ℔ 4 c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4¼c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4½c net
⅞, ¾ and ⅝ in. diam. over 4 ft. long..... " 4¾c net
⅞, ¾ and ⅝ in. diam. from 1½ to 4 ft. long " 5¼c net
Bridge bolts with upset ends.....½c. ₩ ℔ extra
Wrought iron plates, punched.....5c. ₩ ℔ net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at Screw End,				₩ set of	8 bolts..	55c
12	"	½	"	"	8 " ..	70c
10	"	9-16	"	"	8 " .. }	90c
12	"	9-16	"	"	8 " .. /	
14	"	9-16	"	"	8 " .. }	$1 00
10	"	⅝	"	"	8 " .. /	
12	"	⅝	"	"	8 " .. }	1 00
14	"	⅝	"	"	8 " .. /	
16	"	⅝	"	"	8 " ..	1 20

5c ₩ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₩ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....60c
" " 3 " " 65c
" " 3¼ " " 70c
" " 3½ " " 75c
Wagon Brake Ratchets, each.....16½c
" " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " " 2, each.....10 c
" " " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 sets.....dis 25 %
Wagon Box Staples, 1¼ to 2¼ in. to clinch, ₩ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on, ₩ 1000 7 50 net
Neck Yoke Eyes, each.....4¾c net
" " with ⅝ rings, each.....7¼c net
King Bolts, ⅝, 1, 1¼, and 1½ in. diam.....₩ ℔ 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths..... " 8¼c net
Wagon Rivets, 3-16 in. diam., all lengths..... " 9½c net
" " & Nails, in 5 ℔ paper boxes....₩ ℔ 1c extra
" " in 25 ℔ wood " ¼c extra
Wagon and Hinge Nails, ¼ in.....₩ ℔ 17 c net
" " " 3-16 in..... " 19 c net
Double Tree Plates..... " 8¼c net
Coupling " ..... " 5¼c net
Tongue " ..... " 9 c net
Neck Yoke Plates..... " 11 c net
Tongue Cap Iron, 1¼, 2 & 2¼ in. wide, same price ₩ ℔ as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₩ ℔ 10¼c net. ¼ in., 11½c. net

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(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal | Copper Bottoms....34c
IC, 10x14.....$11 50 | **Planished Copper.**—
IX, 10x14..... 14 25 | Sheathing, 14x48.....41c
XX, 10x14..... 17 00 | Boiler Size, No. 7.....43c
IC, 12x12..... 12 00 | " " No. 8.....43c
IX, 12x12..... 14 75 | " " No. 9 .....45c
IC, 14x20..... 12 50 | Tinning ₩ sheet, 14x48 10c
IX, 14x20..... 15 25 | " " No. 7 10c
XX, 14x20..... 18 00 | " " 8 14c
XXX, 14x20..... 20 75 | " " 9 16c
XXXX, 14x20..... 23 50 | **Pig Tin.**—
DC, 100 Plate..... 11 00 | Large Pigs.....29c
DX " ..... 13 25 | Small Pigs.....29c
DXX, " ..... 16 50 | Bars.....31c
DXXX " ..... 19 25 | **Solder.**—No. 1..... 17c
DXXXX 100 Plate .. 22 00 | No. 2..... 16c
IX, 14x14..... 23 50 | **Bright Wire.**..dis 37½ %
IC, 10x14 W..... 11 00 | **Sheet Iron.**—
IX, 10x14 W..... 13 75 | No. 18 Am. Com.....4 80
Roofing Tin.—Best Char. | No. 24 Am. Com.....5 00
IC, Terne, 14x20.....$10 25 | Pat. Am. Russia "A,"
IX, " 14x20..... 13 00 | Nos. 24, 25 & 26.....14½c
IC, Terne, 20x28 .... | Russia, Nos. 9, 10, 11 & 12. 19c
IX, " 20x28 .... | Pat. Planished Russia,.. c
Coke Tin.— | Russia No. 9, 10, 11&12,.. c
IC, 10x14 Coke..... $9 50 | W. D. WOOD'S & CO.'S SHEET IRON.—
IX, 10x14, Coke .... 12 25 | Nos. 15 to 20 Smooth $6 10
IC, 14x20, " .... 10 50 | " 21 to 24..... 6 30
Sheet Zinc.— | " 25 & 26..... 6 80
Any width.....9¾c | " 21 to 24 Char'l.. 7 80
Copper.— | " 25 & 26 " .. 8 00
Sheathing.....33c

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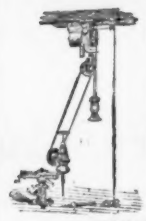

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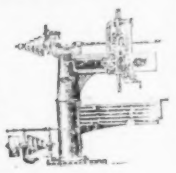

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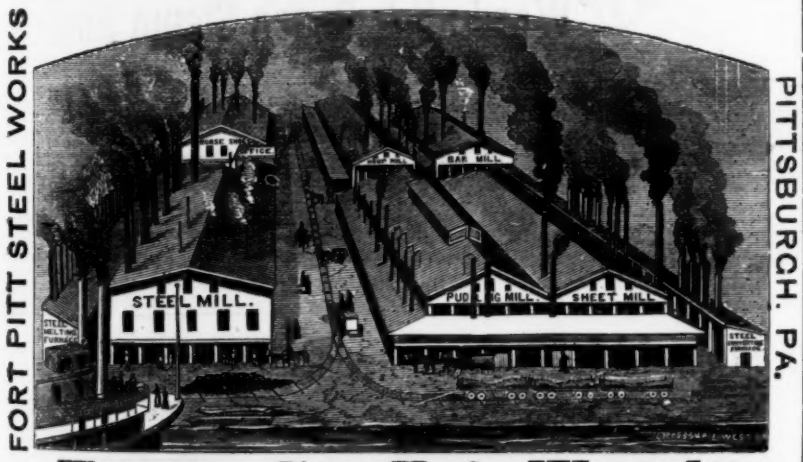

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Hoes and Garden Rakes—Jackson and Otsego...dis 30 %
Scythe Stones.....dis 25 %
Scythe and Bush Snathes.....dis 25 %
Harvest Rakes and Barley Forks.....dis 25 %
Revolving Horse Rakes.....dis 25 %
Handles—Fork and Shovel.....dis 25 %
Cradles—Nithington, Cooley & Co.....dis 45 %
—Genuine Morgan.....₩ doz net $34 00

Augers and Bits.—

Ives' extra C. S.	dis 30 %	Snell's	dis 10 %
Jennings'	dis 5 %	" Car Bits	dis 10 %
Cook's	dis 30 %		

Axes.—Amoskeag Yankee.....₩ doz $12 00
Amoskeag Crescent..... " 13 00
Hunt's Bronzed..... " 12 00
Jefford's Silver Steel..... " 12 50
M. A. & Co. Clipper..... " 12 50
Mann's Red Warrior, Beveled..... " 12 50
" Double Bitt..... " 25 00
Handled Axes..... " 15 00
" " Boys..... " 12 00
Kennebeck..... " 11 00

Bolts.—Carriage and Tire.....dis 70 @ 10&5 %
Cast Barrel and Shutter.....dis 20&10 %
Wrought Iron Barrel.....add 10 %
" Square.....net list

Butts.—Cast Fast Joint, Narrow.....dis 30 %
Cast Fast Joint, Broad.....dis 20 %
" Loose Joint.....dis 50&5 %
" " Pin, Reversible.....dis 40 %
" " Japanned.....dis 35 %
" " Silver Tipped.....dis 35 %
Wrought Narrow, Fast Joint.....dis 80 %
" Broad " " .....dis 30 %
" " Loose " .....dis 37 %
" Loose Pin.....dis 30 %
" Table.....dis 30 %
" Brass.....dis 10 %
Garretson's Blind Butts, Wood.....doz sets $1 75
" " Brick.....doz sets 2 75
Parker's " Wood.....doz sets 1 85
" " Brick.....doz sets 2 75

Casters.—Iron Plate.....dis 25 %
Brass Wheel Plate.....dis 25 %
Porcelain Wheel Plate.....dis 25 %
" " Bed.....dis 25 %
Iron Wheel Bed.....dis 25 %

Chisels.—Butcher's Tanged Firmer.....dis 30 %
" Long Paring.....dis 30 %
Witherby Socket Framing.....dis 50&20 %
" " Firmer.....dis 50&20 %
" " Corner.....dis 50&20 %
" " Slicks.....dis 50&20 %

Coffee Mills.

Box 4 Iron	$ 3 75	Box 85 Cast Steel	$12 00
" 103 "	5 25	Side 50	4 75
" 102 "	6 25	" 60	5 75
" 107 Britannia	7 50	" 70	7 25
" 106 "	8 50	" 90	18 00
" 25 Union	10 50	" 15 Union	7 00
" 35 "	12 00	" 30 "	8 00
" 75 Cast Steel	10 50		

Cutlery.—American Table.....dis 20 %
" Pocket.....dis 25 %

Door Springs.—Torry.....₩ doz $5 00
Rubber..... " 4 00
Boon's..... " 5 00

Drawing Knives.—Witherby Tool Co.....dis 50&20 %
Ohio Tool Co.....net list

Files.—Butcher's.....$7 00 £
Nicholson's.....$5 00 @ $5 50 £

Hammers.—

Maydole's	net list	Yerks & Plumb	net list
		Cheney	net list

Handles.

Extra Axe	₩ doz. $3 00	Coal Pick, No. 1	₩ doz $2 00
No. 1 Axe	" 2 25	Sledge, No. 1	" 2 00
No. 2 Axe	" 2 00	Hatchet	" 65
R.R. Pick, No. 1	" 2 00	Hammer, A. E.	" 65

Hatchets.—

Amoskeag Shingling	$7 25	$8 00	$8 75
" Claw	7 75	8 50	9 25
" Lath	7 50	8 25	
" " Solid Steel			12 00

Hinges.—Strap and T.....dis 20&10%
Screw Hook and Strap, 6 to 12 in.....8c, ₩ lb
" " 14 to 24 in.....6½c, ₩ lb
Hook and Eye Hinges.....net 12c. @ 16c, ₩ lb
Gate, No. 35, State.....₩ doz $3 50
" No. 3, In and Out..... " 3 50
" Blinn's Pat..... " 7 50

Hog Ringers.—Hill's Patent.....₩ doz $6 00
Hill's Patent Rings.....₩ 100, 25c
" Tongs.....₩ doz $5 00

Horse Nails.—Northwestern, 8d.....24c
Ausable, 8d.....24c
Globe, 8d.....26c

Kettles.—Brass.....54c

Locks and Knobs.—			
Norwalk Lock Co.	dis 45 %	Enameled	dis 30&10 %
Branford "	dis 45 %	EagleLock Co.	dis 15 %
		Am. Pad Locks	dis 35 %
		Conti'al Lock Co.	dis 10 %
		Woodruff Patent	net list
		Stowe's Sausage Stuffers	net list
		Enterprise Patent	dis 5 %

Meat Cutters.—
Haven's Patent ..net list
Hale's " ..dis 10 %

Molasses Gates.—
Stebbin's Patent . dis 50 %

Nails.—10d to 60d.....per keg $4 00

Oil Stones.—Washita No. 1.....net 30c ₩ lb
Washita Slips.....net 60c "
Hindostan No. 1.....net 9c "
" Axe.....net 10c "
" Slips.....net 15c "

Picks and Mattocks.—Picks, Railroad,
Axe Finish.....₩ doz $12 00
Picks, Coal, Axe Finish..... " 10 00
Mattocks, L. C., Axe Finish..... " 15 00
" S. C., " " " 14 50
Grub Hoes, Axe Finish, No. 2..... " 1 00

Planes.—Ohio Tool Co., Bench.....dis 35 %
Sciota.....dis 35 %
A. Howland & Co., Bench.....dis 30 %
" Fancy.....dis
Bailey Patent Iron.....dis 15 %
Plane Irons, Butcher's.....dis 30 %

Rivets.—Iron, dis 10 @ 15 %

Tinned	dis 10 @ 15 %	Copper, No. 7	net, ₩ lb, 50c

Rules.—Stanley Rule and Level Co.....dis 50&10 %
Hubbard & Curtiss Mfg. Co.....dis 50&10 %

Sad Irons.—Best A No. 1..... ₩ lb, 4c
" Copper Face Star.....₩ lb, 4½c

Sandpaper.
Baeder & Adamson's No. 0 to 1½...per ream, net $1 50
" No. 2 to 3..... " net 5 00
Wiggins & Stevens, No. 0 to 1½.....₩ ream, net, $4 50
" No. 2 to 3..... " 5 00

Sash Locks.—Champion.....₩ gross, net, $12 00
Hopkins & Dickinson.....dis 10 %
Judd's Patent.....dis 10 %
Corbin's Patent.....dis 10 %
Clark's Patent.....dis 20 %

Saws.—H. Disston & Sons.....dis 10 %
Champion X Cut.....₩ foot, net, 60c
M. A. & Co. X Cut..... " " 50c
Lightning Cut..... " " 66c

Screws.—American Screw Co.—Iron...new list dis 50 %
American Screw Co.—Brass.....dis 50 %

Shovels and Spades.
Ames' Black Shovels.....₩ doz $14 50
" Polished " ..... " 15 50
" Patent " ..... " 18 00
Ailing " ..... " 16 00
" " " Molders'..... " 18 00
Crane's Black " ..... " 11 50
" Polished " ..... " 12 00
Smith's " " B. S. L. H. Rd. Ft..... " 13 50
" " " B. S. D. H. Rd. Ft..... " 14 00
Ames' Black Spades..... " 16 00
" Polished " ..... " 17 00
" Patent " ..... " 17 50
Ailing " ..... " 16 00
Crane's Black " ..... " 12 50
" Polish'd " ..... " 13 50

Scoops.—Ailing Steel Polished, No. 2.....₩ doz, $13 50
Ailing Steeled Polished, No. 3..... " 14 00
" " " No. 4..... " 14 50
" " " No. 5..... " 15 50
" " " No. 6..... " 16 50
" " " No. 7..... " 17 50
" " " No. 8..... " 18 50
" " " No. 10..... " 21 50
Crane's Polished, No. 5..... " 13 50
" " No. 6..... " 14 50
" " No. 7..... " 15 50
" " No. 8..... " 16 50
Crane's Black Coal, No. 4..... " 17 50
" " No. 5..... " 18 00
Preston, Black Scoops No. 1..... " 12 00
" " No. 2..... " 12 50
" " No. 3..... " 13 00
" Half Pol. Scoops No. 1..... " 12 50
" " " No. 2..... " 13 50
" " " No. 3..... " 14 50
Lippincott, Half Pol. No. 2..... " 15 00
" " No. 3..... " 16 00

Wrenches.—Taft's.....dis 60 %
Coe's Imitation.....dis 50 %
Coe's Genuine.....dis 35 %

Wringers.—Novelty Clothes Wringer.....₩ doz $65 00
Universal Clothes Wringer..... " 69 00

Chicago Metal Market.

(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.)

Tin Plate.—

10x14, IC, Ch'l. Good	$	14x20, IXX, Ch'l Best	$16 00
10x14, IC, " Best	12 00	14x20, IXXX, " "	22 00
10x14 IX, " "	15 00	DC, 100 Plate, " "	12 00
12x12, IC, " "	12 50	DX, " "	15 00
14x12, IX, " "	15 50	DXX, " "	18 0
14x20, IC, " "	13 00	DXXX, " "	21 00
Roofing IC, Charcoal, Best			11 50
Roofing IX, Charcoal "			14 50
20x28, IC, Charcoal Roofing, Com			24 00
20x28, IC, " Good			23 00
20x28, IC, " Best			23 00
20x28, IX, " "			24 00
10x14, IC, Coke Plates			10 50
14x20, IC, "			11 00
10x20, IC, "			18 00

Block Tin.—

Large Pigs	32c	Bars	32c
Small	31c	Straits, 2c. higher.	

Zinc.—Sheet, 500 to 1000 lb. Casks.....9¾c
Loose Sheets.....10c
Slab Zinc or Spelter.....6¾ to 7¼c

Copper.—Bottoms.....32c
Sheathing.....32c
Planished.....40c
" Boiler lengths.....4 c
Ingot.....25c to 25c
Bolt.....40c

Braziers' Sheets.—

30x60, 6 to 10 lbs.	₩ lb 41c	30x60, 15 to 100 lbs.	₩ lb 35c
30x60, 10 & 12 lbs.	" 38c		

Solder.—F. S. & Co.'s make.

Best Fine	22c	Roofing	18c
No. 1	20c	Braziers' or Spelt. Sold.	35c

Antimony.....18c

Babbit Metal—F. S. & Co.'s.....16c
No. 2.....14c

Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata.
No. 24	4¾c	5¾c	7¾c	9¾c
25 & 26	5 c	6 c	7¾c	9¾c
27	5¼c	6¼c	7¾c	9¾c

Galvanized Iron.....dis 15 %

No. 16 to 20	12c	No. 27	15c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—

Perfect	20c	No. 1 Stained	19c
		In Sheets, 1c. higher.	

American Russia.—

A	15c	B	13c
		In sheets, 1c higher.	

Lead.—

Pig	7¼c	Lead Pipe, in full coils	8¼c
Bar	8¼c	Lead Pipe, when cut	8¾c
		Sheet Lead	8¾c

Wire—Bright.....dis 30 %
Coppered.....dis 25 %

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.)

Apple Parers.—Reading.....per doz $8 00

Augers.—Watrous Ship.....dis 10 %
L'Hommedieu Ship.....dis 15 %

Axes.—Forester's Favorite, Bronzed.....$12 50
Blue Jackets, Blue..... 12 00
Excelsior, Black..... 11 5
Chopper's Price, Bronzed..... 11 00
Red Cross, Red..... 10 50
Red Cross, Handled..... 13 50
Boy's Handled Blue Jackets..... 12 00

Axe Handles.—Wadleigh's Oak—
A (Extra) $2 50. B (No. 1) $2 00. C (No. 2) $1 50 ₩ doz

Blind Hinges.—Washburn's.....per hundred set $9 50
Blind Fasts.—Washburn's.....per hundred set $5 75

Bolts.—Carriage. Phila.. " Girard Works.....dis 50&5 %

Borax.—Best Refined.....₩ lb 16c

Borers.—Angle, Backus'.....dis 30 %

Boring Machines.—Angle.....each $4 75
Common. Snell's quality.....each 3 75

Braces.—Barber's.....dis 40&5 %
Backus'.....dis 50 %
Spofford's.....dis 40 %

Brass Faucets.—L. F. & C.....dis 25 %

Butts.—Union Drilled Loose Joint.....dis 60 %
" " Wire Fast Joint.....dis 50 %
" " Acorn Loose Joint...dis 50&10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....dis 30 %
Wrought Narrow Butts.....dis 30 %

Cartridges.—" U. S. Cartridge Co."....dis 50 %

Chisels.—"Buck Bros.' Shank Goods....add 20 @ 22½ %
Sockets.....add 22½ @ 25 %

Compasses and Dividers.—Bemis'.....dis 35 %
P. S. & W.....dis 25 %

Cordage.—Manila (usual trade dis.).....₩ lb, 16c
American Tarred Hemp Lath Yarn.....₩ lb, 10c

Corn Hooks......per doz $4 00

Crow Bars.—Iron. Steel Points.....₩ lb, 5¾c
" Sweet" Steel Bars.....₩ lb 11c
Brown's Steel Bars.....₩ lb 10c
K. P. & Co. Extra Drill Steel.....₩ lb 15c

Dividers.—Cook's Nickel Plated.....dis 15 %

Door Springs.—Stimson's Patent.—
No. 4, Light Inside doors, $12 00.....dis 25 %
No. 8, " outside " $18 00.....dis 25 %
Torrey's.....$4 00

Emery.—Alden.....₩ lb 7c
Wellington Mills.....₩ lb 10c

Files.—Earl Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 10 %
Nicholson.....$5 to £ currency, less 1.½ %
" Regular Taper.....dis 12½&5 %
Stubb's Tapers, genuine, 3 in., $1 50; 3½, $1 62; 4, $1 88; 4½, $2 13; 5, $2 50.

Funnel Irons.—$2 50 2 50 2 50 3 25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3 50 3 75 4 00
5, 5½, 6 inch.

Hammers.—Maydole, new reduced list, July 1st, 1874.....dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $11; 2, $12; bell face, No. 1, $11; 1½, $9 75.

Hangers & Rollers.—Novelty.....dis 30 %
Anti-Friction.....$1 75 per pair—dis 30 %

Hatchets.—Underhill Edge Tool Co.....dis 10 %
Underhill pattern, solid, C. S. lathing.....$9 00
Underhill Bros. pattern, solid C. S. Lathing.....10 00
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4 75; 1, $5 25; 2, $5 75
Claw.....1, 5 75; 2, 6 25
Lathing.....1, $5 50
Axe Pattern.....$7 00; 2, 7 50
Broad....0, $5 75; 1, $6 50; 2, $7 50; 3, $9 25; 4, $10 75; 5, $12 75; 6, $14 75.

Hinges.—Strap and T, Stanley Works.....dis 20&10 %
Plate, Loose and Fast Joint.....₩ lb 7½c
Wrought Screw Hook.....₩ lb 8c

Hoes.—Ely Baich & Co. M., B. & D.'s list, 1874...dis 25 %
Remington, M., B. & D.'s list, 1874.....dis 30 %

Lead.—Sheet and Pipe.....7¾c—less 10 %

Locks.—P. & F. Corbin.....new list dis 45&5 %
Nashua.....dis 45&5 %

Manure Forks.—
Myers & Ervien, M., B. & D.'s list, 1874.....dis 25 %
Peck, Clark & Co., " " .....dis 25 %
Shumway & Co., " " .....dis 30 %

Mattocks.—K. P. & Co., axe finish, long cutter..$13 75
Short cutter.....13 50

Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₩ lb

Nails.—10c. and larger.....$4 00

Padlocks.—Wilcox.....dis 50&2 %
All Brass. 2½ inch. 2 keys. job lot.....$9 00

Picks.—K. P. & Co., Polished Points—
5 to 6.....per doz $9 00; 6 to 7, $9 50

Plus.—Universal Hat and Coat—
All wood, 2 in.....₩ gross $2 50; 3 in., 3 5.; 4 in., 4 50

Potato Digger.—
" Partridge," 6 square tine.....₩ doz $12 00
Shumway & Co., 6 round tine..... ₩ doz 9 00

Pulleys.—Clark & Co.'s Axle, 2 in.....per doz 42c

Plated Ware.—Rogers Bros.....new list dis 40 %

Plumb & Levels.—"Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels.....dis 50 %
No. 2, First Quality Levels.....dis 60&10 %
No. 3, Iron Pocket " .....dis 35 %
No. 4, Level and Plumb Glasses.....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge.....dis 50&10 %
No. 6, Improved Iron Bench Planes.....dis 20&10 %

Pocket Knives.—Conn. Cutlery Co.....new net list

Rakes.—Cast Steel, garden.....dis 30 %
Malleable.....dis 25 %

Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c., dis 10 %

Rivets.—Black.....dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8,
13 13 14 14 15 16c ₩ lb net

Sad Irons.—Bless & Drake.....₩ lb 4½

Sand Paper.—0 to 2, $4 25; 2 to 3, $4 75..new list dis 10 %

Saws.—Disston's.....dis 12½ %
Lightning X cut, Boynton's.....per foot 6½c
" Saw Blades, 32 inch.....per doz $7 00
" Framed Saws.....per doz 8 50
Common " .....per doz 6 00
Disston " " .....per doz 9 00
One man X cut.—Lightning.....$2 75 each
Disston's $3 00 each.....dis 12½ %
Wheeler, Madden & Clemson.....dis 15 %
" " " Mill.....dis 25 %
" " " Circular.....dis 25 %

Screws.—American Screw Co.....revised list dis 52½ %

Scythe Stones.—
"Willoughby Lake," first quality.....₩ gross $6 50
" " second quality..... " 3 00

Shovels.—O. Ames.....new list dis 12½ %
M. B. & D.....new list dis 12½ %

Spading Forks.—M. & E.....dis 25 %

Stone Pickers.—"Partridge," original...₩ doz $15 00

Tools.—Aiken's Pattern, 20 in set; Miller's Falls, $12 00 per doz.....dis 15 %

Traps.—Oneida.....dis 20 %
Blake's.....dis 20&5 %

Vises.—K. P. & Co.'s Solid Box, Blacksmith...₩ lb 14½c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
" Howards." Parallel.....dis 20 %

Wardrobe Hooks.—Wire to drive.....₩ gross $1 00

Weights.—Window Weights.....₩ lb 24c

Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₩ ft 6c

Wrenches.—Genuine Wrenches, A. G. Coes..dis 40&5 %

Wringers.—
Novelty and Universal } Tub No. 2 } .....per doz $67 00
Novelty Bench, No. 4.....per doz 104 00
Eureka.....per doz $60 00

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.—₩ box

I. C. Char. 10x14	@ $11 00	IX, continuous, 20 in. x 200 ft.	
I. C. Coke 10x14	9 50	IC, 10x14, best Coke	$16 50 @ 11 00
Char. Roof. IC, 14x20	11 25	IC, 10x14, good Coke	10 00
Coke " IC, 14x20	10 25	IC, 10x20	17 00
Pig Tin.—	₩ lb	IC, 14x20	14 00
Banca	30c	IC, 10x28, Coke Lead	9 50
Straits	26c	IX, 10x14, punch'd for Safes	10 00
English	24c		

Zinc.—Sheet..... ₩ lb 9¼c

Iron.—Sheet Iron, Russia..... 15c
Sheet Iron, English..... " 5 c
" " American Refined..... " 5½c
" " Galvanized..... " 10c
Plate Iron..... " 4
Swedish and Norway Bar Iron, gold.....₩ ton, $122 50
" " " Shapes, gold..... 130 00
Norway Nail Rods, first quality, gold..... 145 00
" " second " " 145 00
Best Refined Bar Iron..... 67 50
The "Burden Best" Iron..... 105 00
American Pig Iron, Foundry, No. 1, x..... 35 00
" " " No. 2, x..... 33 00
" " Gray Forge..... 30 00
Scotch Pig Iron.....₩ ton 37 00 @ 40 00
Wrought Scrap Iron..... 30 00

Steel.— ₩ lb

Eng. Tool	15c	German	10½c
American Tool	15c	Spring	4½c
" Mach	10½c	Tire	6½c
Bessemer	7½c	Sleigh Shoe	
		Toe Calk	7½c

Copper.— ₩ lb
Sheathing..... 33c
Bolt..... 30c
Ingot..... 20½c

Lead.— ₩ lb
Pig..... 6¾c
Sheet and Pipe..... 7 2c

Spelter...... ₩ lb 8c

Antimony...... ₩ lb 14c

Chicago Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.

Tin Plate.

IC, 10x14, Char	$11 00@11 50	IX, continuous, 20 in. x 200 ft.	
IX, 10x14, "	14 50	IC, 10x14, best Coke	$16 50 @ 11 00
IC, 12x12, "	12 00	IC, 10x14, good Coke	10 00
IX, 12x12, "	15 00	IC, 10x20	17 00
IC, 14x27, "	12 50	IC, 14x20	14 00
IX, 14x20, "	15 50	IC, 10x28, Coke Lead	9 50
IC, 14x20, Terne	$10 75@11 00	IC, 10x14, punch'd for Safes	10 00
IX, 14x20, "	13 00		
IC, 20x28, "	21 50@22 00		
IX 20x28, "	25 50@26 00		
IC, continuous, 20 in. x 200 ft			

Block Tin.

Large Pigs	38c	Bars	40c
Small "	39c		

Sheet Zinc.

Casks	₩ lb 8¼c	Sheet	₩ lb 10¼c

Solder.
No. 1, Refined, in bars or plate.....$17 00 @ 18 00
No. 2, " " " 16c
Pig Lead.....7½c

Sheet Copper.—18 to 100 lbs. Sheets 30x60.....32c
14 to 16 lbs., Sheets 30x60..... 32c
10 to 12 lbs., " and 20x72..... 32c
6 to 9 lbs., " 33c
Tinned, 14 and 16 oz. 14x48..... 31c
Planished, 14 and 16 oz. 14x48..... 31c
" No. 7, 8 and 9..... 29c
Copper Bottoms..... 32c

Sheet Iron.—

	Com'n.	Sm'th.	Char'l.	Juniata
No. 16 to 20	4½c	5½c	7¾c	9¾c
No. 22 to 24	4½c	5½c	7¾c	9¾c
No. 26	4¾c	5¾c	7¾c	9¾c
No. 27	5 c	6 c	7¾c	9¾c

Galvanized Iron.....dis 2[illegible] %
Iron Rivets.....dis 25 %
Iron Wire.....dis 35 %
Copperes Market Wire.....dis 30 %
Copper Rivets and Burs.....dis 20 @ 25 %
Russia Iron.—Nos. 9, 10, 11 and 12. ₩ lb.....30c
No. 1 stained. ₩ lb..... 15c
Imitation Russia. ₩ lb..... 15c
Retinned Stamped Ware.....dis 35 %

ST. LOUIS.

Corrected weekly by Semple, Birge & Co

Anvils.—Armitage.....₩ lb, gold 12c
Peter Wright's..... " 14c
Wilkinson's..... " 12½c

Apple Parers.—Conqueror.....₩ doz, $9 00
Lightning..... 9 00
Turn Table..... 9 00

Axes.—Hunt's.....₩ doz $13 00 @ 18 50
Lippincott's..... " 12 00 @ 13 00
Lippincott's Pioneer..... 13 00 @ 13 50
Simmons'..... " 12 00 @ 13 00

Axes.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles.....new list net
Swelled Taper Axles.....new list net
Concord Axles.....new list net
Red Jacket Axles.....[illegible] at net
Common Axles, 1¼ inch and upward.....₩ lb 8½c
" " less than 1¼ inch..... " 8½c

Bellows.—"Best St. Louis make" 60c. ₩ n. dis 20 %

Bells.—Troy, Church.....₩ lb, 50c
Light Brass Hand.....dis 50 %
Moore's, Cow.....dis 20 %

Bolts.—Arms, Bell & Co.'s Machine.....dis 20 %
Arms, Bell & Co.'s Carriage and Tire.....dis 75 %

Cast Butt Hinges.—Western Butt Co.'s—
Narrow Fast Joint.....dis 35 %
Broad Fast Joint.....dis 50 %
" Loose " .....dis 60 %
Reversible.....dis 50 %
" Japanned and Silver Tipped.....dis 45 %
Loose Joint "Acorn" " " .....dis 55 %
Lull & Porter's Blind.....dis 50 %

Wrought Butts.—Narrow.....dis 25 %
Reversible.....dis 30 %
Broad.....dis 30 %

Chain.—Eng. Coil. 3-16 ¼ 5-16 ⅜ 7-16 ½ in.
15 11 10 9½ 9 8c gold
Trace.....6 5-10-2 6 "
7-10-2 70c "
German Coil and Halter.....revised list add 10 %

Chisels.—Socket, Firmer or Framing.....dis 60 %

Clothes Wringers.—Crown.....₩ doz $60 00
Novelty..... " 69 00
Universal..... " 69 00
Monitor..... " 69 00

Corn Cutters or Hooks.—Solid Steel.....₩ doz $4 00

Corn Knives.—Dunn Edge Tool Co.'s Clip..₩ doz $5 75
Disston's..... " 6 00

Crow Bars.—Steel Pointed.....₩ lb 7c

Cutlery.—J. Russell & Co.'s.....
Lamson, Goodnow & Co.'s..... } new list, dis 15 %
Landers, Frary & Clark's.....

Files and Rasps.—
Nicholson's Files.....$5 00 less 5 %
Butcher's Mill.....$6 75
Heller's & Bros Horse Rasps.....dis 40 %

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 30 %
" " Handled Hoes.....dis 30 %
" " Planter Eye Hoes.....add 15 %
Winsted's Planter Eye Hoes.....add 15 %

Hammers.—Yerkes & Plumb.....dis 5 %
Masons' Hammers.....₩ lb 30c
Smith Hand Hammers..... " 28c

Handles.—Axe.....Extra. $2 75 | No. 1. $2 25 | No. 2. $1 75 | No. 3 $1 00
Pick.....Extra. $2 50 | No. 1. $2 00 | No. 1½. $1 75 | No. 2 $1 25
Smith & Montross Fork, Hoe and Rake.....dis 30 %

Harrow Teeth.—1 inch iron.....₩ lb 4½c
⅞ and ¾ inch iron..... " 4¾c
⅝ inch iron..... " c
Barbed or Headed.....½c extra

Hatchets.—Hunt's.....dis 10 %
Simmons'.....dis 15 %

Hay Knives.—Lightning.....₩ doz $20 00
Dunn Edge Tool Co.'s.....₩ doz $14 50—dis 15 %
Fisher's..... " 16 50—dis 10 %

Hinges.—Strap and T—St. Louis make.....dis 25 %

Horse Nails.—Ausable.....22c rates
Northwestern.....22c "
National Patent Pointed.....21c "
" " " Extra Finished.....22c "

Horse Shoes.—R. I. (Perkin's pat.).....₩ keg $6 5
Burden's..... " 6 50
Mule Shoes..... " 7 50
Rhode Island Trotting Shoes..... " 9 00

Locks and Latches.—
Jones & Nimick's.....revised list dis 40 %
Moorhead, Adams & Co.....revised list dis 40 %
Norwalk Lock Co.'s.....revised list dis 40 %

Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₩ doz. $14 75 @ 15 25
" Grub Hoes, Oval Eye....₩ doz. 10 75 @ 12 00

Nails.—Wheeling.....$3 75 rates.
Orders for 100 kegs 10c ₩ keg less.

Picks.—Klein, Logan & Co.'s R. R. and Clay ₩ doz.$11 00
Klein, Logan & Co.'s Coal..... " 8 50
" " Poll..... " 11 00
" " Stone..... " 14 50
" " Tamping..... " 17 00

Planes.—Ohio Tool Co.'s.....dis 30 %
Sciota.....dis 40 %

Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 30 %
Barton's Patent.....₩ doz $25—dis 30 %
Vaughn's " .....25—dis 10 %

Sad Irons.—Monitor Brand, Silver Polished..₩ lb 4c

Sash Weights.—Standard Solid Eyes.....₩ lb 3½c

Saws.—Disston's.....dis 10 %
Hubbard, Lippincott, B. & Co.'s.....dis 10 %
Branch, Crooks & Co.'s.....dis 10 %
Livingston's Patent Buck.....dis 15 %
.....net list

Screws.—American Screw Co.'s revised list....dis 50 %

Scythes.—
Dunn Edge Tool Co.'s.....new list dis 25 %
Paris Furnace Co.'s.....dis 50 %

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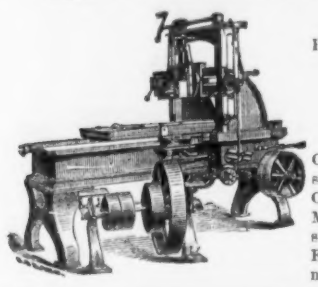

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ROLLER TUBE EXPANDERS

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JACKS for Pressing on Car Wheels or CRANK PINS made to order.

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With or without Hood.

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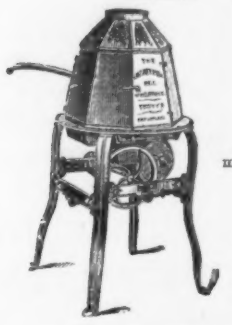

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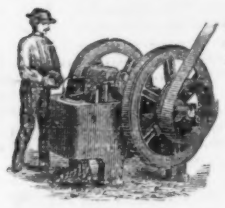

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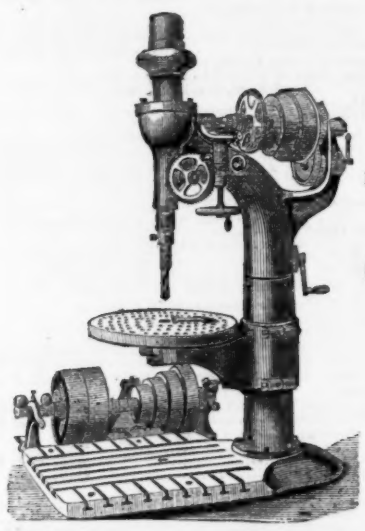

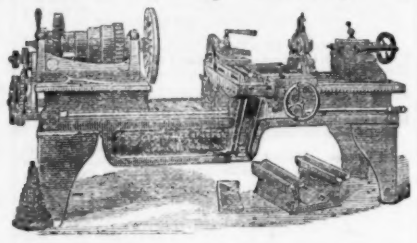

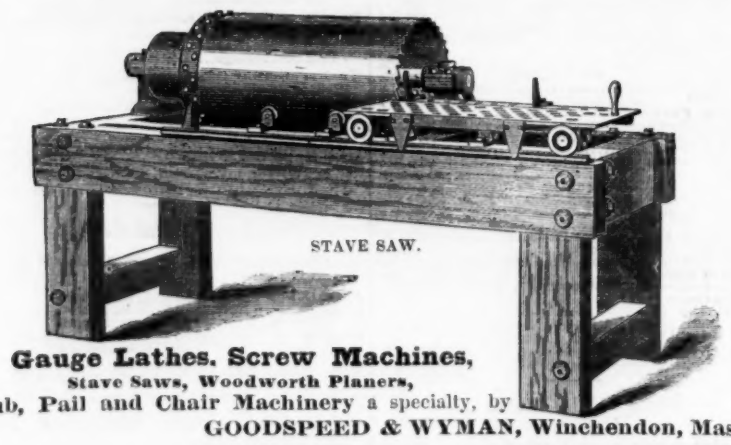

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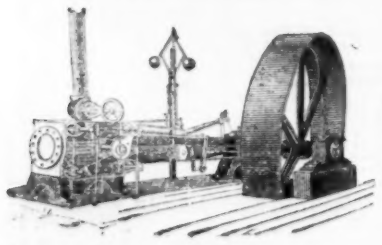

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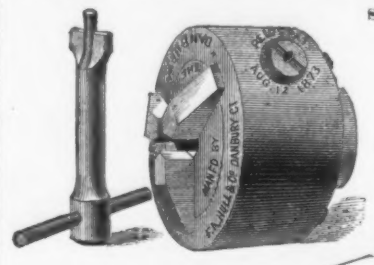

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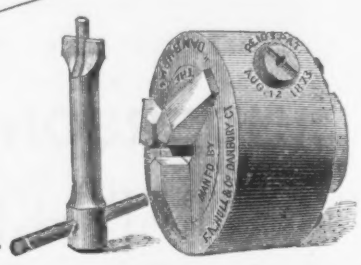
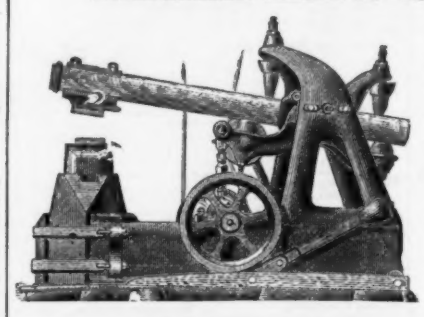


C. H. Reid's Patent, Aug. 12th, 1873.

BRADLEY'S CUSHIONED HAMMER.



This Hammer has many valuable improvements made useful in the device for cushioning the blow, thereby relieving all the working parts from that jar and concussion which is the destroying element of other Helve Hammers. It is made Adjustable in Line of Action, Length of Stroke, Rapidity of Motion, and Weight of Blow, all of which are controlled at the will of the operator. They have ***Larger Capacity, Cost Less,*** are more ***Durable,*** take up ***Less Room,*** o ***More*** and ***Better Work*** at ***Less Expense*** for Power, than any othe Hammer in use. We guarantee them fully as recommended. For particulars, address

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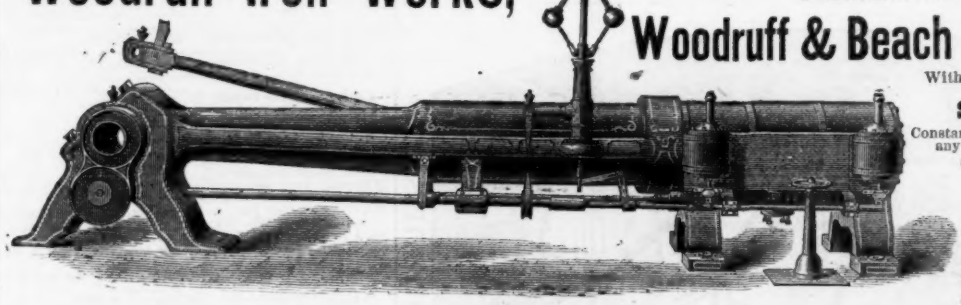

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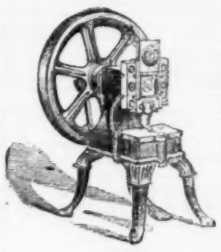

Number.	00	0	1	1¼	2	2½	3	Tinners.	Tinners.	Tinners.	Tinners.	Boiler.
Price, with all improvements.....$	100	150	200	250	300	400	500	400	600	800	500	400
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Size of opening in bed.....in.	2x2	2x4	4x7	5x8	6x9	7x10	8x11	12 dia.	20 dia.	26 dia.	14x20	2x2
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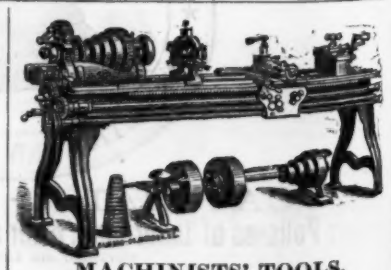

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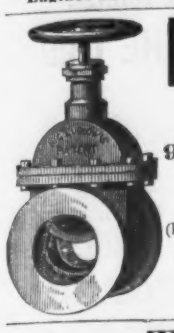

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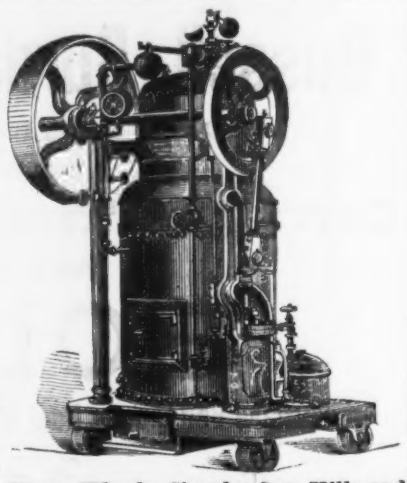

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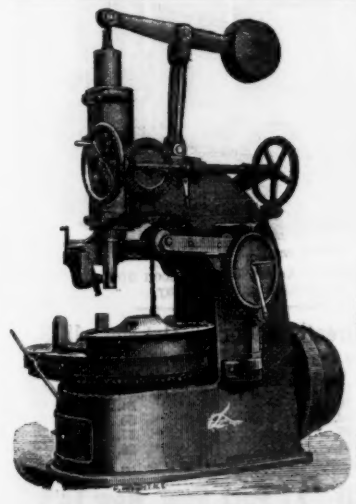

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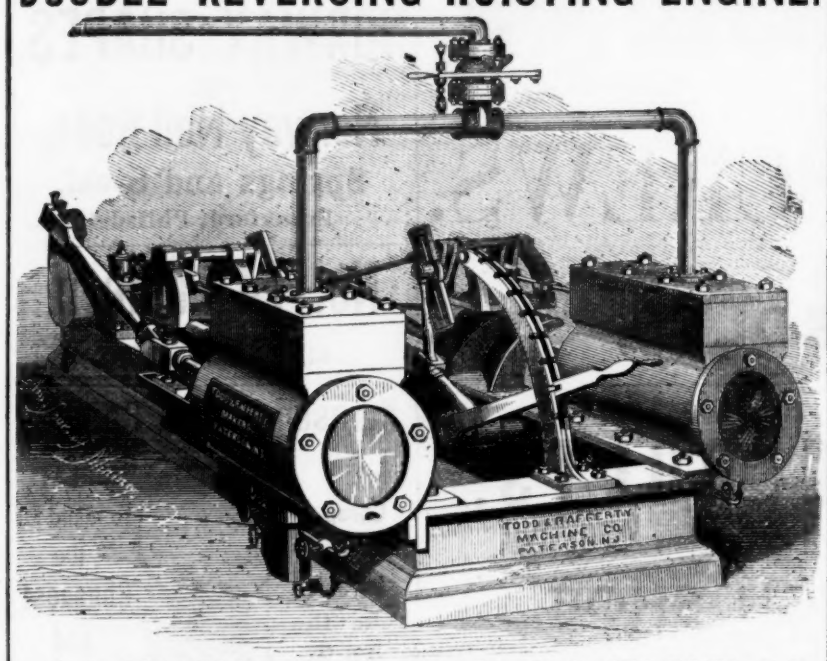

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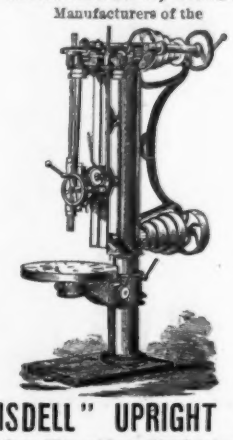

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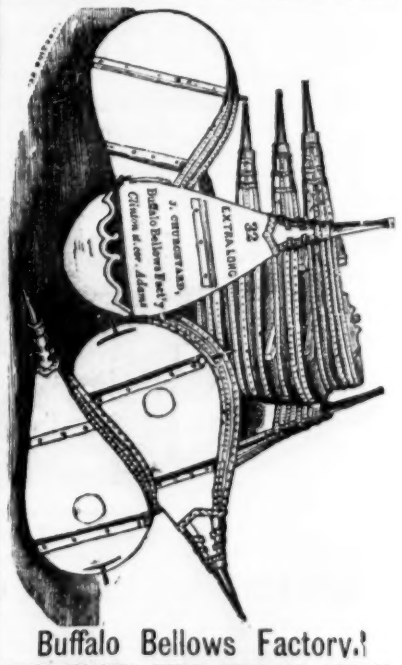

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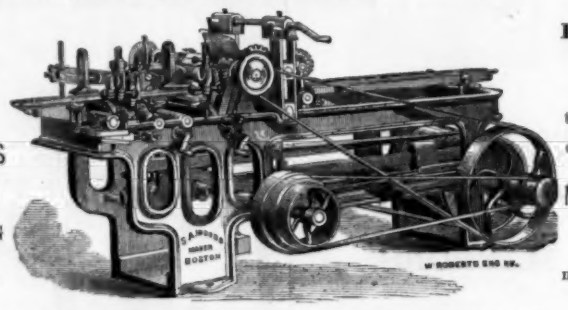

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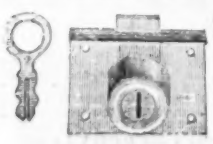

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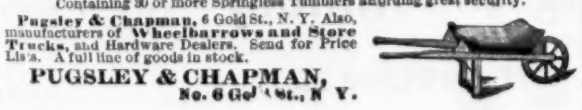

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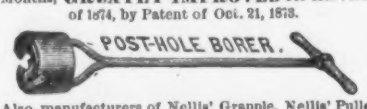

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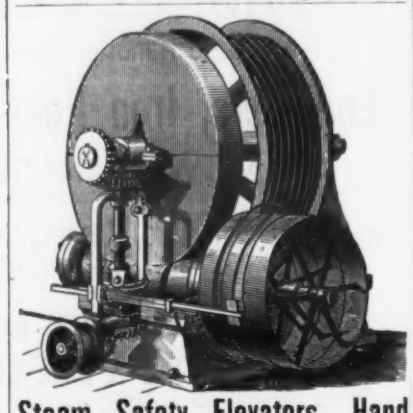

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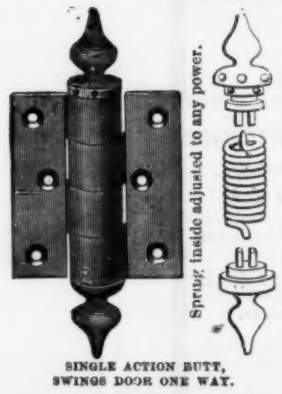

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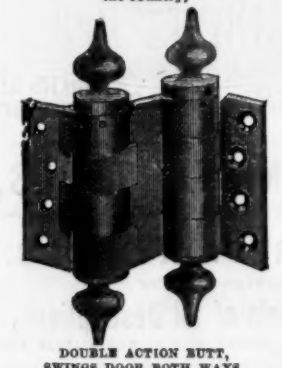

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6 " "	16	4 00	7 " "	54	9 50
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